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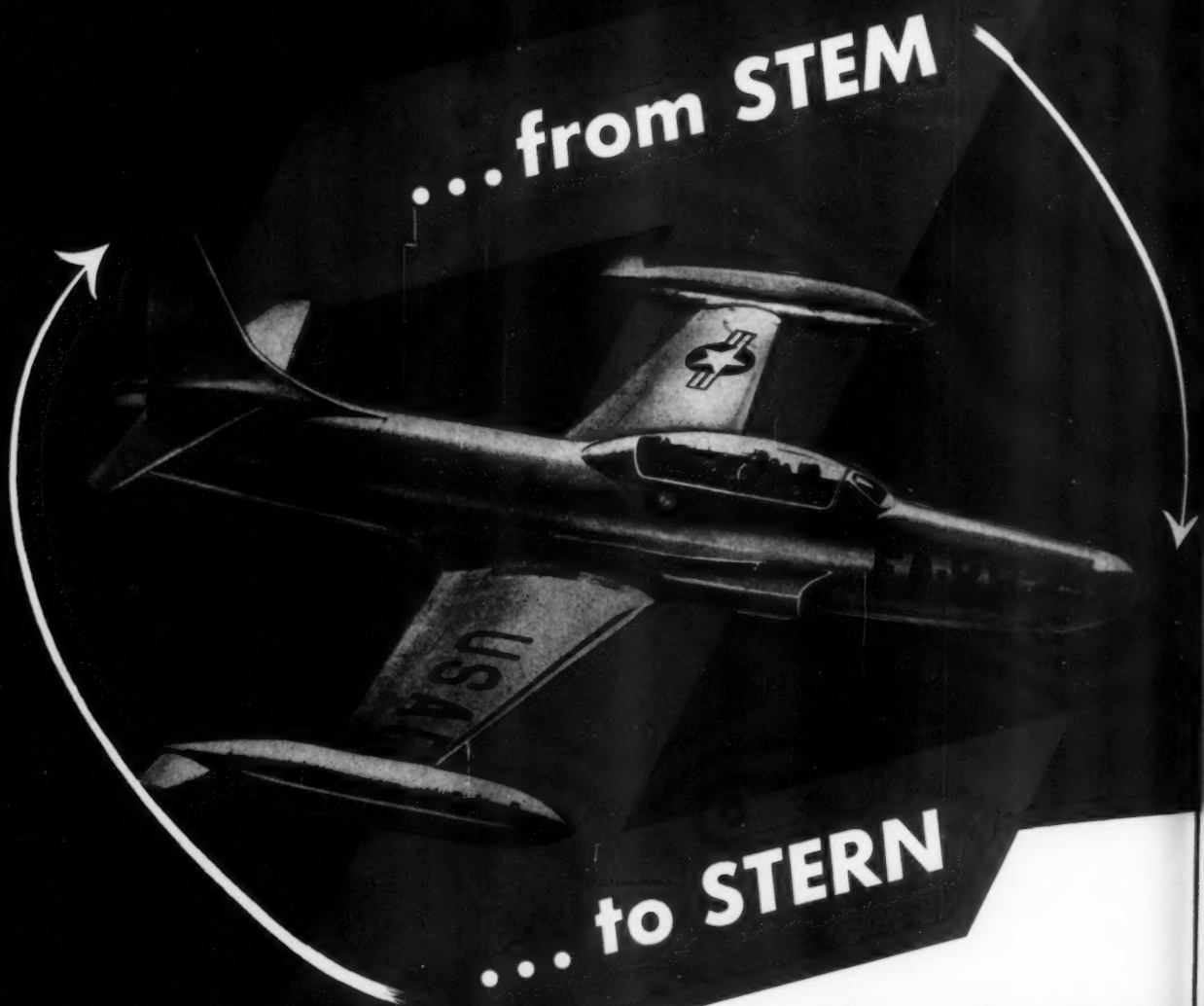

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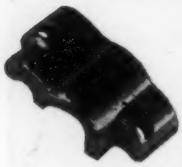

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Aviation Week

ABP Member ABC

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Electronic Analogue Computers. *For fire control of guns and rockets, for missile guidance, for jet engine horsepower control.*

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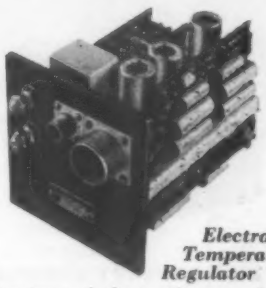
Whatever your problem in electronic controls, consult AiResearch.



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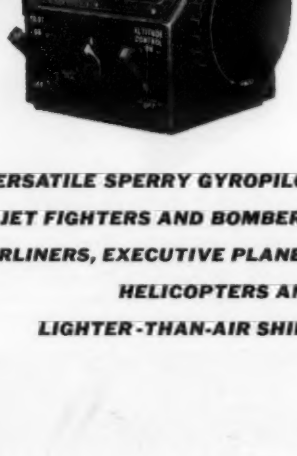

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NEWS DIGEST

DOMESTIC

Small business show for prospective USAF subcontractors, held in Will Rogers Memorial Coliseum, Ft. Worth June 25-30 pulled more than 5,800 people, with 2,889 firms registering.

Personal pilots must have their CAA identification cards by Sept. 1 or face grounding. Recent check shows that pilots have been slow in their response. Any CAA safety agent in a district office or at regional headquarters will assist in issuing the cards. Applicants must apply personally.

New ferrying organization of MATS has flown first four or more than 100 U. S. jet planes bound for NATO countries to Newark, N. J., for trans-shipment overseas. Initial planes were dual-control Lockheed T-33 trainers.

Explosion demolished interior and seriously damaged walls of 20 engine test cells at the Allison division of General Motors Plant 3 early on the morning of July 3, causing an estimated $7.5 million damage. Eight workers were killed. Officials blamed the blast on ignited fuel vapors from a fractured jet-engine supply line or gauge. One said the blast would not affect Allison jet engine production and would not slow up its engineering program materially. Plant 3 is being used to build tank and other heavy duty transmissions and GM locomotive parts.

CAB draft release proposes regulation reducing maximum operating weight of Curtiss twin-engine C-46 transport as a passenger carrier. It will not apply to cargo carriers. Reduction is from 48,000-lb. gross to 45,800 lb. effective Oct. 1, 1951 and a second reduction to 43,500 lb. effective Oct. 1, 1952. This is outcome of recent flight tests by CAB on the plane, following accidents attributed to overloads.

FINANCIAL

Air Associates, Inc., has executed a $5-million revolving credit under V-loan agreement with five banks headed by New York Trust Co. to assist in financing the firm's defense contract commitments.

Beech Aircraft Corp. has voted a quarterly dividend of 20 cents per share on its 599,865 outstanding shares of common stock. Dividend is to be paid on Aug. 3 to holders of record July 24. Total Beech sales for first nine months of the fiscal year were $22 million, with total net income being $502,867.

Continental Air Lines has announced a dividend of 25 cents per share payable on July 30 to stockholders of record July 19.

Elastic Stop Nut Corp. of America has reported total operating and other income, before taxes and provision for possible renegotiation, of $1,416,121 for the six months ended May 31, compared with $340,254 for the same period a year earlier. After the deductions, net income was $378,121, against $210,754 a year ago. Gross sales for the first six months were $5,007,620 and backlog at May 31 was $7,513,135. ESNA is paying a 25 cents per common share dividend on Aug. 1 to holders of record July 16.

Pioneer Air Lines has made a net profit of $45,097, after federal taxes, for the first six months of 1951. Passenger revenues for the period were $1,025,605, gross charter revenues $287,798.

Solar Aircraft Co., San Diego, Calif., and Des Moines, Iowa, reported earnings of $1,214,200 for the fiscal year ended Apr. 30, highest net income in its history. The earnings are after federal income and excess profits taxes and refunds on government contracts. Backlog at Apr. 30 was $43,383,000 compared with $8,903,000 a year earlier. Net sales for the fiscal year were $25,576,000, compared with $21,488,335 a year earlier.

INTERNATIONAL

Percival P. 56 trainer for the RAF (Alvis Leonides) has been named the Provost.

Swissair received first DC-6B of its order for three June 27. The planes will be used on de luxe high speed service between Zurich and New York.

IATA Clearing House in London handled $11,488,000 in international air traffic transactions during April, bringing the total turnover for the first four months of 1951 to $47,404,000.

Saide, Egyptian international airline, was to establish a direct link with Munich and Frankfort on July 4 as a continuation of its present Cairo-Rome-Milan route.

WHEREVER YOU GO
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OPERATIONAL NEEDS

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THE ARC TYPE 11A
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Adds two-way VHF communication. System includes tunable VHF receiver and a five-channel, crystal controlled VHF transmitter. As many as four of these transmitters may be installed providing up to 20 channels.

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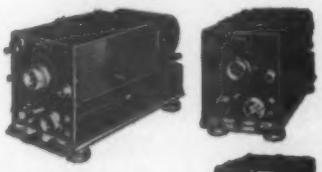

Gives you the combined advantages of the type 11A and the Type 17 systems. You get two-way VHF communication and LF range reception, as well as rotatable loop navigation.

Ask about ARC Type 15C Omnirange equipment and ARC's 10-channel Type F11 Isolation Amplifier. Write for all the details.

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SIDELIGHTS

Air Force

Secretary Finletter told the first group of officers to complete a new course in manpower management that top USAF policy is to develop more firepower and use fewer men . . . Officers' **tour of duty** at the Pentagon can't exceed four years—one year over normal limit of three—without express permission from USAF Chief of Staff . . . Air Force last week arranged **lectures** for its generals, colonels and high ranking civilians so they could learn how to write. Writing expert John McElroy, Columbus, O., of Readability Associates, was teacher . . . **Stead AFB**, Reno, Nev., will be reactivated Aug. 1 for SAC . . . University of Washington has been awarded a **$100,000 contract** to test effectiveness of word-to-mouth communication resulting from leaflets dropped from planes. It's designed to determine how fast such pamphlet messages will spread, what percentage of the population they are likely to reach in a given time, and how wide an area they will cover . . . Air Force halted all **flying by inactive reserves**, at least till the end of the current fiscal year next June 30. Reason: aircraft shortage.

Wilson & Plane Output

According to insiders, **Charles E. Wilson's** second quarterly report that aircraft deliveries "are currently about two-thirds higher than a year ago" means that production has increased only about 30 percent. They say Wilson was talking about the "rate" of increase.

Industry

Aeroproducts Division, of Dayton, has a new 22-man branch office of AMC, to administer Aeroproducts & Frigidaire contracts and subcontracts . . . **Bellanca** Aircraft Corp. has signed subcontracts to make fins, rudders and rudder tabs for the Martin P5M-1 Marlin anti-sub patrol seaplane . . . **Lt. Gen. Albert C. Wedemeyer**, retired, will become a vice president and director of Avco Mfg. Corp. . . . AIA members have agreed **not to recruit workers** from each other's plants. . . . **National Institute for Reduction of Industrial Absenteeism, Inc.**, 270 Park Ave., NYC, has been organized as a non-profit organization combining efforts of industrialists, statisticians, engineers, physicians, and social scientists.

Civil Aviation

CAA has published a **new booklet** of 200 questions and answers to prepare would-be pilots for future written examinations for private pilot ratings. Questions are in "true or false" form . . . American Association of Airport Executives is the eleventh organization to join the **National Air Council**. The others are Aeronautical Training Society, Air Freight Assn., ATA, ADMA, Corporation Aircraft Owners Assn., NAA, NASAO, NATA, National Flying Farmers' Assn., and University Aviation Assn.

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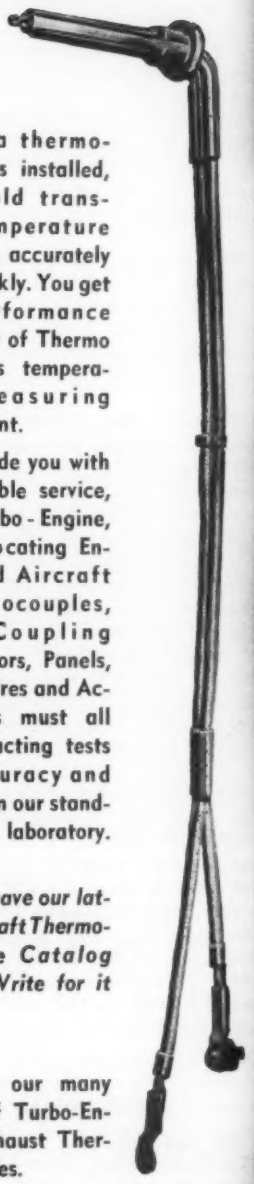

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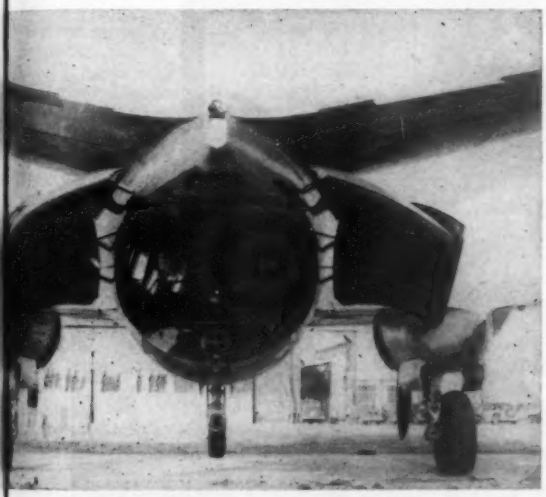
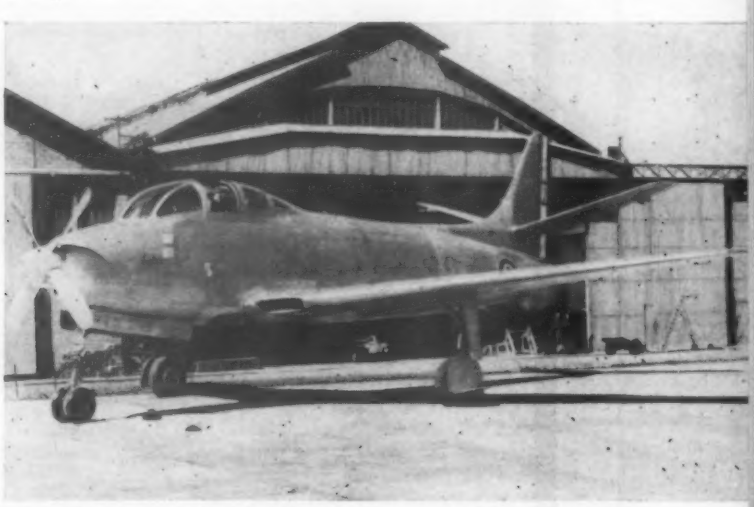
FAIR LAWN Thermo Electric CO. INC. NEW JERSEY

NEW FRENCH AIR-DO—The big, new SO-4000 two-place jet bomber (2 Hispano Nene), which began flying in March, in the air with wheels and flaps extended. Wings are swept 31 deg. Considered the best of France's new bombers, the SO-4000 grosses 48,510 lb.

New Foreign Military Aircraft



FRENCH DOORS—Large, widely extending cargo doors mark Sud-Ouest SO-30C transport. Recently, the plane chuted some Jeeps, which caused c.g. shift of 20 percent of wing chord without incident.

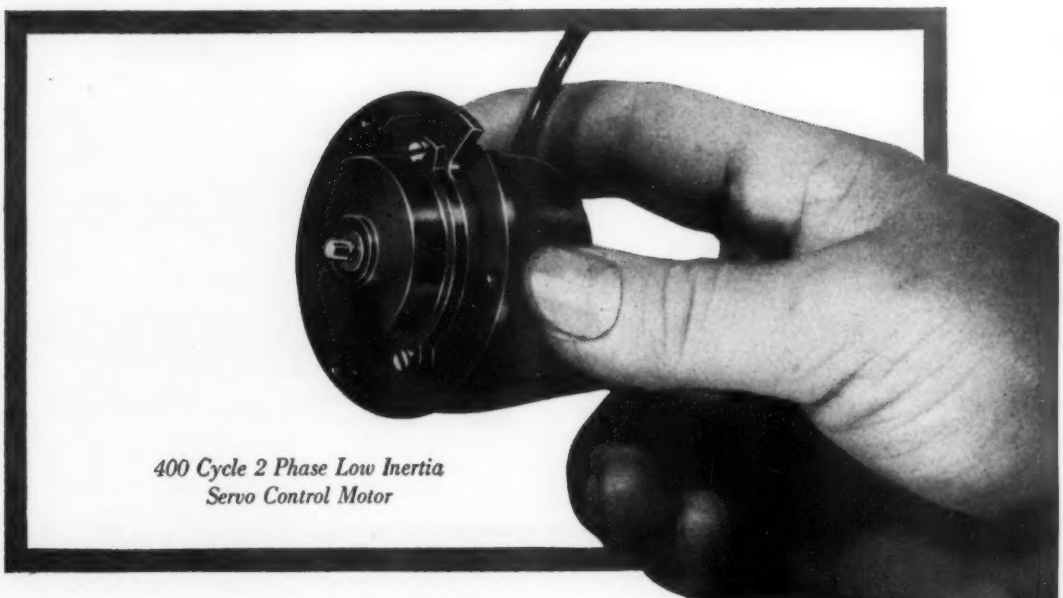


TURBOPROP PLUS TURBOJET—New Breguet 960 Vultur carrier-based fighter has nose mounted turboprop powerplant, also a Hispano Nene turbojet mounted in rear of fuselage. It weighs 22,204 lb. gross, has folding wings. Using turboprop it cruises three hours at 248; top speed is about 550 mph.

ODD SCIENTIST—Novel H.P. 88 research plane (below), designed by Handley Page and Blackburn & General Aircraft and built by the latter, recently made its first flight. Featured is an experimental wing designed by HP, which has considerable sweep, mounted on a Vickers Supermarine 510 fuselage. The H.P. 88 has a single Rolls-Royce Nene.

Oster REG. U.S. PAT. OFF. **Skyline—in AC and DC**

CONTROL MOTORS



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WHO'S WHERE

In the Front Office

Charles B. Buckley and **Arnold Johnson** have been appointed vice presidents of Weber Aircraft Corp., a subsidiary of Weber Showcase & Fixture. Buckley, previously general manager of the former aircraft division, will handle sales; Johnson, formerly works manager of the showcase and fixture company, will handle manufacturing operations in his new position.

Robert B. Cotton, previously chief engineer of All-American Airways' Engineering and Research division, has been promoted to vice president-engineering. The division is engaged in secret work for the USAF and Navy.

Changes

J. H. Waterbury has been appointed assistant manager of Pacific Airmotive Corp.'s Engine division. . . . **Walter V. Scholz** has been designated technical representative for hydraulics section of R. M. Hollingshead Corp.'s Industrial-Aviation division to work on technical military phases of H-2 nonflammable hydraulic fluid.

Al Soderquist, formerly staff engineer at Boeing-Seattle, has been named administrative engineer, one of the three new posts created in company's engineering division. The other positions have been filled by **George Schairer,** now chief of technical staff; and **George Martin,** chief project engineer, aircraft. Three senior project engineers received new assignments: **Tory Gamlem,** from the B-50 to the B-47; **Al Kelsey,** from 377 to B-50 and C-97; and **Dick Rouzie** from the C-97 to the "advanced" C-97 project. New staff engineer assignments are **Bill Cook,** aerodynamics; **Martin Schuehle,** processes and standards; and **W. I. Andrews,** education and procedures.

Dr. Louis T. Rader has been designated manager of engineering for General Electric's Control Divisions, Schenectady, N. Y. He has named **Harry L. Palmer** as his assistant and **Benjamin Cooper** as division engineer of the Electronics and Regulator Engineering division.

Maj. Gen. R. C. Coupland (USAF, Ret.) has been appointed manager of the newly formed product development department of Koppers Co.'s Metal Products division. Coupland has had extensive aircraft armament experience.

Logan MacMillan has been named chief flight test engineer for McDonnell Aircraft Corp.

What They're Doing

Carl A. Posey, CAA airport engineer, and **Raymond M. Dudley,** communications engineer, have been assigned to the Ecuadoran government, and **Royce G. Kunze,** CAA air carrier safety agent, will head a civil aviation mission to Venezuela. The three consultants have been assigned as part of U. S. cooperation with other countries under the Point Four program.

INDUSTRY OBSERVER

► Air Force is preparing proposed military characteristics for a new heavy helicopter competition. They call for a machine capable of transporting a 28,000-lb. payload with a 350-mile range. It is expected that the helicopter called for will be a replacement of the Hughes XH-17 still undergoing ground tests. Air Force is said to be dissatisfied over the extreme short range (50-miles) design performance of the XH-17 flying crane.

► Air Materiel Command is giving serious consideration to a plan of returning damaged planes and those due for major overhaul to the parent manufacturer for repair. This is an adoption of the German World War II plan.

► Air France is investigating the possibility of extending its North Atlantic route currently terminating at New York. One extension would be to Mexico City via Houston, the other to Bogota via Havana and Caracas.

► With defense contracts already totaling more than $1 billion, Ford Motor Co. has entered negotiations to produce Boeing B-47 wing sections for Boeing, Douglas, and Lockheed at Kansas City, Mo. Production will be handled at the company's 127-acre Claycomo facility. Plant is now under construction.

► Ryan Aeronautical Co. is scheduled to go into volume production on exhaust cones for the 7,200-lb. thrust J-65, under Wright Aeronautical Corp. sub-contract.

► Percival Aircraft Ltd. will be a new British competitor in the helicopter manufacturing field. Percival is forming a new helicopter manufacturing division under leadership of L. G. Frise, technical director, best known for his Frise aileron developments.

► The Allison division's Convair Turboliner is having its first two experimental hand-built T-38 turboprops replaced by production T-38s each rated at 2,750 equivalent shaft hp., at Edward AFB., Muroc, Calif., preparatory to additional test flights there. The engine replacement is to give the plane typical production engines for its cargo run testing.

► Republic Aviation has begun conducting tests of the Graviner Explosion Suppression System (AVIATION WEEK **June 11, pg. 45). The device, especially suitable for combat aircraft, suppresses an incipient fuel tank explosion (caused by bullet penetration, for instance) before it can generate enough power to cause structural damage. The system is marketed in the U. S. by Simmonds Aerocessories, Tarrytown, N. Y.**

► British European Airways has resumed its experimental cargo run with a turboprop Mamba-powered Dakota (Douglas C-47) between London and Paris. The cargo run was started in the summer of 1950, and is to get additional experience on turboprop operations.

► Italian Air Force has received a total of 200 World War II type U. S. military planes under Mutual Defense Assistance Program thus far. Of the number, 100 were North American F-51 Mustangs, 75 Republic F-47 Thunderbolts, and 25 were trainers, presumably North American T-6s. Latest reports indicate that five F-47s have already been destroyed and one pilot killed in training accidents with these planes in Italy. Later this year Italy is due to receive its first American jets, some Republic F-84 fighters.

► Reports persist that USAF is still studying a refueling project for jet fighters, which would involve their making contact at wingtips of a very-long-range tanker, possibly a B-36, to extend escort fighter range. Refueling idea is an outgrowth of various parasite fighter proposals, particularly the plan to sling Republic F-84 jets under the wingtips of B-36 bombers (AVIATION WEEK Feb. 13, 1950).

Washington Roundup

More Air Power?

The push for a 150-wing USAF has started on Capitol Hill.

Sen. Henry Cabot Lodge opened it with a plea for the build-up in testimony before the Senate Appropriations Subcommittee considering the '52 fiscal year military budget. Subcommittee member Sen. Kenneth Wherry picked up the ball. And the subcommittee's chairman, Sen. Joseph O'Mahoney, assured a full going-over of the proposal with the Joint Chiefs of Staff.

The drive for the big USAF has been underway at the Pentagon for some weeks.

Its chief obstacle: the "economy" tide sweeping the Administration and Congress.

• JCS Chairman, Gen. Omar Bradley, as well as Gen. Dwight Eisenhower, Supreme Commander, Allied Forces in Europe, are understood to favor the 150-wing build-up. The emphasis would be on tactical aviation necessary to the strategic plan to "hold" Europe.

• Army's Chief of Staff, Gen. Lawton Collins, and Chief of Naval Operations, Adm. Forrest Sherman, are expected to go along with the build-up—or a shaved-down version.

• USAF's Chief of Staff, Gen. Hoyt Vandenberg, and Secretary for Air Thomas Finletter are 100 percent in favor—with more emphasis on strategic air than planned.

The 150-wing program would comprise:

• 62 strategic air wings of long- and medium-range bombers and fighter escort.

• 50 tactical air wings for dispatch to Europe.

• 38 wings for air defense.

Of the Administration's program for a 95-wing USAF by the end of 1952, Lodge commented: "It's really only a 50-group program—15 of the groups are transport groups and the others are half-equipped with old fighting planes." A 95-wing force manned with up-to-date aircraft would require $22 billion this fiscal year—instead of the $19.8 billion proposed by the Administration.

The USAF build-up would mean:

• **Moneywise,** USAF would leap far in the lead of the other two services. Present calculation is that the 150-wing build-up would require; $32 billion for the current 1952 fiscal year; $27 billion for the 1953 fiscal year; and $37 billion for the 1954 fiscal year. Army's proposed 1952 budget: $20.8 billion. Navy's is $15.1 billion.

• **Manpower-wise,** USAF would push ahead of the Army. The 150 wings would require 1.8 million military personnel. Army's goal: 1.5 million.

More Air Admirals

The proportion of air admirals in the Navy's command is still on the upswing.

Of the Navy's 36 new admirals, 10, almost a third, have air backgrounds.

The newcomers boost the number of air admirals to 74—over 52 percent of the total of 304 admirals. Ten years ago less than nine percent of the admirals were for air: in July, 1941, only nine out of the total of 102.

The 36 new admirals give Navy and Marine Corps more top brass in proportion to military personnel than either Army or Air Force:

• **Army** has a general for every 3,540 military personnel.

• **Air Force** has a general for 2,740 military personnel.

• **Navy and Marine Corps** now have an admiral or general for every 2,670 military personnel.

CAB Friends and Influence

CAB's former Chairman, Joseph O'Connell willingly accepted Senators' invitation to testify on Board ethics and publicly deliver this message: that most of the attempts to influence Board decisions come from Congress.

Under questioning, he conceded that airline executives are "never particularly hesitant about putting their best foot forward" in office interviews or at lunch. But, he added, "they recognize—most of them—that your responsibility is to decide the case on its merits."

Under a CAB regulation, O'Connell won't be eligible until next fall to represent airline interests with cases pending while he was Chairman—two years after his departure. But he's already signed up as a Panagra counsel in a newly-initiated case.

O'Connell's report on White House participation in airline affairs: "No, I do not think I ever talked to anyone in the White House about a domestic route case." But, O'Connell added, "of course, the international route cases are the President's business." At the time of O'Connell's resignation, it was widely reported the reason was White House over-ruling of CAB on the Pan American-American merger case.

O'Connell also said:

• **On clean-ups.** "It takes quite a bit of courage to go against your own organization. . . .

"I realize that . . . it is too much to expect that administrators will clean their own house. . . . There is no way of avoiding periodic exposures to light up bad situations."

• **On CAB-airline collaboration.**

O'CONNELL: "In mail pay increases, the adversaries are the Board, on the one hand, and the carrier . . ."

SEN. PAUL DOUGLAS: "The adversaries did you say?"

O'CONNELL: "Yes. Do I not make myself understood?"

DOUGLAS: "I heard the words and I want to be discreet and not impugn the Board in my comments, but I had suspected at times that the Board was not the adversary of the airlines but the collaborator . . ."

O'CONNELL: "It depends on who you talk to. . . . An airline executive rarely believes he has been used fairly by the Board for an extended period of time. If he wins the case, he thinks the Board is doing an excellent job."

DOUGLAS: "This is the best tribute I ever heard about CAB since I have been in Washington."

• **On government support.** O'Connell conceded that CAB's policy is to keep scheduled lines in business with government support, and not, as Arkansas' Sen. William Fulbright proposes "let them go bankrupt when they deserve it and have a management reorganization . . ."

FULBRIGHT: "It strikes me rather unusual that in the development of this great aircraft transportation industry that no major line has ever been permitted to go bankrupt. In hearings on the Northwest Airlines ($20 million RFC-guaranteed loan) it came out that no matter how inefficient they are, you . . . supported them."

O'CONNELL: "We had a problem whether we would say to RFC 'you help Northwest Airlines to buy the equipment they have committed themselves to buy . . . and we will pay the mail pay (to cover it), or we had to let Northwest go to the cleaners—and we decided not to."

—Katherine Johnsen.

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Separation Brings Praise and Problems

Airlines back new mail formula but fear complications.

Civil Aeronautics Board's plan to speed up separation of compensatory mail pay from subsidy for all domestic airlines is generally applauded by spokesmen for the carriers—even though it will open the way for a new set of problems in the future.

The Board has already set future compensatory rate of 45 cents a ton mile for the "Big Four."

On CAB's announcement that it would set compensatory rates for the other 34 scheduled domestic carriers by Sept. 30, All-American Airways' President Robert Love, commented:

"The carriers are pretty well unified, all strongly endorsing the Board's action. It would be 100 percent wrong to leave it to Congress to set rates. We want the separation. On subsidies, we want it pointed out that they are needed to support service to the small communities."

▶**Action Forced**—Behind the Board's unexpected speed-up action was the prospect that Congress would set rates in legislation—a course unanimously opposed by airlines. Rails joined them, protesting that it would set a precedent for arbitrary rate-fixing by the legislative process, instead of by a quasi-judicial agency after hearings.

But this procedure was threatened after CAB's Chairman Donald Nyrop a short time back estimated that the Board, operating on a case-by-case basis, wouldn't be able to complete separation for all domestic carriers by July 1, 1952.

Senate Interstate and Foreign Commerce Committee's chairman, Sen. Edwin Johnson, objected: "The watchword of CAB on the matter is manana—manana that never comes. They have been dilly-dallying now for years, and still at this late date are not ready. If it's left to CAB, I don't think there ever would be any separation."

This is the outlook now:

CAB's Sept. 30 report will probably be in two parts:

• **Setting compensatory rates** for the 34 trunk and local scheduled airliners (aside from the Big Four) for the period from July 1, 1951 on, and earmarking the additional sums paid as subsidy;

• **Setting mail rates** on the old basis in which the subsidy element is included for the 20 carriers seeking retroactive mail pay for the 1947 through 1950 period.

The 20 carriers probably will be awarded only a fraction of the $20.7 million in back pay they are seeking. As a matter of strategy, a maximum figure is generally asked. The Big Four, which sought $68.9 million in back pay for the 1947-50 period, actually settled for a 63-cents-a-ton-mile rate under which they will refund approximately $5 million to the government.

Now that CAB has taken action, Congress probably won't upset the apple cart. The prospect is that it will pass legislation underwriting in statute the CAB separation program. The legislation is likely to direct separation, authorize separate appropriation of funds

What the Carriers Want

Pending airline requests for additional mail pay for the calendar years from 1947 through 1950 total $98.8 million, according to a report by Civil Aeronautics Board to the Senate Interstate and Foreign Commerce Committee. Domestic carriers, aside from the "Big Four" whose cases were recently settled, are bidding for $21.5 million in back pay; international carriers, for $77.3 million. Figures below are in thousands of dollars.

CARRIER	REQUESTED FOR 1947-50	AVERAGE TON MILE RATE RECEIVED FOR PERIOD	AVERAGE TON MILE RATE REQUESTED FOR PERIOD
Trunk Lines			
Colonial	$2,659	$13.10	$20.65
Inland	57	5.71	(1)
National	3,694	2.74	4.58
Northeast	1,117	17.14	19.81
Northwest	7,800	1.61	2.33
Western	1,480	2.37	(1)
TOTAL TRUNK LINES	$16,807		
Local Service Lines			
All-American	$1,574	31.69	35.44
Bonanza	167	95.25	124.98
Central	80	39.13	43.07
Challenger	86	28.50	33.85
Mid-West	47	32.21	34.57
Monarch	21	50.51	(2)
Robinson	660	25.09	39.07
Southern	485	27.47	34.68
Lake Central (formerly Turner)	18	70.70	(1)
Wiggins	22	118.70	(1)
Helicopter Air Service	51	19.44	21.47
Los Angeles	126	10.97	12.06
Ozark	126	25.26	55.28
Frontier	400	27.21	34.89
TOTAL LOCAL SERVICE	$3,883		
Territorial Lines			
Caribbean	$129	25.50	(1)
Hawaiian	696	.62	3.85
TOTAL TERRITORIAL	$825		
International and Overseas			
American	$249	.66	1.12
American Overseas	11,817	2.52	4.39
Braniff	853	41.20	49.97
Chicago & Southern	2,683	78.12	126.05
Eastern	22	.65	.75
National	1,396	5.84	35.90
Northwest	7,519	2.35	3.55
PAA-Alaska	2,927	3.00	4.70
Atlantic	19,327	3.51	5.23
Latin American	13,735	1.67	2.62
Pacific	2,374	2.61	(1)
Panagra	993	7.14	7.91
TWA	11,481	2.83	3.82
United	1,974	.73	1.63
TOTAL INT. AND OVER	$77,302		

(1) Not reported.
(2) Monarch is requesting a $49.03 rate for 1950 during which year the carrier received a $46.96 rate.

for compensatory pay and subsidy, and set down effective dates for separation—probably Sept. 30 for domestic carriers, retroactive to July 1, 1951, and July 1, 1952 for international carriers. The Board plans a report on that date separating international mail pay and subsidy.

Should Congress pass legislation voiding the CAB program, laying down compensatory rates, or requiring a different method for rate calculation than that being followed by the Board, the President probably will veto it.

▶ **New Problems**—With separation now on the horizon, here are some of the new problems that face the scheduled airline industry:

• Purse-string control over subsidy grants will put Congress in the thick of the situation. Observers feel that politics may overshadow national interest considerations in the development of the air transportation system.

• Railroads will put up stiff opposition to any airline subsidies.

• Subsidy grants under the vague "commerce" and "national defense" interests—to enable carriers to maintain up-to-date fleets and promote aeronautical advancement—are likely to have rough going in Congress.

• Airline lobbying will be encouraged. Carriers who don't get grants they think they should have from CAB might be tempted to go directly to Congress.

• Subdividing subsidies to communities is likely to lead to endless log-rolling. Carriers serving states with politically weak congressional delegations could fare poorly—regardless of the importance their service might hold in the national network.

• CAB's plan to gear compensatory mail rates to cost of the service plus a reasonable return on investment, airlines fear, will shackle them with a major burden of accounting red-tape. Key to this approach is allocation of overhead and general expenses among the four classes of service—passenger, express, freight, and mail. It's arbitrary and little more than guess work, the carriers say. Air Transport Assn. estimates that setting up an accounting system to determine the cost of carrying mail, entailing allocation of overhead to the service, would cost the scheduled industry around $3 million, plus $8.7 million annually to maintain.

▶ **What They Say**—Despite CAB's action, Senate Interstate and Foreign Commerce Committee moved ahead last week with hearings on the separation issue.

The key question witnesses dwelt on: How should compensatory mail rates be determined?

• **Stuart Tipton**, general counsel, ATA: Congress should lay down a broad yardstick of "fair and reasonable" compensation, leaving CAB discretion to determine what this might be in each specific case. Interstate Commerce Commission, he pointed out, has such broad discretion in fixing railroad rates.

In addition to imposing an impossible accounting burden on the industry and being arbitrary, Tipton objected to gearing mail pay to cost of the service on two other grounds: it would not take into account "value of service;" and it would keep mail pay on a retroactive basis. Carriers or CAB could only guess cost before they had performed the service.

Airline accountants report, he said, that the number of entrees would increase from 40 to 15,000 times, depending on the character of the expense, if airlines are required to calculate mail service cost.

The method would also open the way for endless litigation, he suggested, since there are at least a dozen formulas for cost allocation.

• **C. R. Smith**, president, American Airlines, seconded Tipton's position. Determining mail pay on a basis of "cost and return on investment," he said, "involves some of the greatest complexities in modern accounting."

• **J. H. Carmichael**, president, Capital Airlines: There should be flat mail rates based on size and weight of shipment and length of haul. The rates should apply to all carriers—large and small.

Setting higher compensatory rates for small carriers operating more costly short-haul routes than for the large carriers, he declared, would mean Post Office Department would channel mail business into the big lines. Capital, he pointed out, is competitive with the Big Four for 50 percent of its mail business. If the Big Four have a rate of 45 cents a ton-mile and Capital's rate is 63 cents, Capital, he predicted, will lose a big portion of its current mail business.

The mail rate, he suggested, should be based on the shortest airline route to the terminal. If the rate is higher for a circuitous routing and stop-offs, he said, regional carriers would suffer.

• **Curtis Barkes**, vice president, United Air Lines: Mail rates should be equivalent to first-class passenger fares. His argument, "Passenger rates represent the selling price of air transportation's principal revenue source. Domestic passenger traffic accounted for 78 percent of the domestic revenue ton miles carried by the air transport industry in 1950." (This is the approach recommended by the New York accounting firm, Ernst and Ernst. It would mean a mail pay rate of around 60 cents a ton mile).

ATA's Tipton opposed this approach. It would mean that small carriers, forced to cut passenger rates to meet competition from big lines, he said, would also have their mail pay rate reduced.

Robert Prescott, president, Flying Tiger Line, endorsed CAB's plan to gear compensatory mail pay to cost of the service. Protesting the use of mail income to subsidize freight operations, he suggested that a fair mail rate would be the "weighted average" between express and freight revenues. At the present express rate of 34 cents a ton mile and the present freight rate of 20 cents a ton mile, this would mean a mail rate of 23 cents a ton mile.

Other points made by witnesses:

• **Barkes, UAL:** The community approach should not be on the basis for subsidy payments. This method does not give proper recognition to the overall national interests of defense, commerce, and the postal service. The development of air transportation is above

LONG-LEGGED KILLER

Grumman AF-2S Guardian anti-sub killer member of hunter-killer team shows off its unusually long landing gear, dictated by high wing position. A very large searchlight for night operations is fitted beneath the port wing, a radome is slung under the starboard wing. The AF-2 is powered by a P&W R-2800 Double Wasp of approximately 2,500 hp. and has a top speed of about 350 mph. In prototype form it had a small Westinghouse turbojet mounted in the rear of the fuselage, but it was discarded early in the plane's development. The AF can operate off escort-class carriers.

all a national benefit and any method of subsidy measurement confined to a restricted local view will not reflect this broader benefit and justification important to the nation as a whole. Development of new-type jet transports and the improvements in landing navigational aids at major airports seem to have little relationship to the provision of local service to the smaller community, yet the community approach appears to tie such developments to the local service level."

• **Smith, (AA):** Although opposing rate-fixing by legislation, he proposed that if CAB does not change its practice of setting rates on a "hindsight" basis and agree to let the 45 cents-a-ton-mile rate that has been set for the Big Four stay in effect for two years, Congress should direct it.

• **Robert Drysdale,** executive vice president, Federation of Railway Progress, a group of railroads that broke connections with Assn. of American Railroads. His recommendations, seconded by AAR: mail pay should be on a basis of cost of service, plus a reasonable return on investment, and subsidization of airlines should be totally eliminated –it isn't fair to the rail competition. Airlines can sell passenger transportation for six cents a ton mile, he said, "Only because the taxpayers are kicking in another four cents a ton mile" in direct subsidy in mail pay and indirect subsidy in the form of maintenance of air navigation facilities and airports. The airlines' passenger business has increased every year since 1939, except for a slight setback in 1948, while rail passenger revenues have fallen off in every year since 1944, he said, because of government subsidies to the airlines. In 1940, he reported, the rails handled 87 percent of the first class business: in 1950, only 53 percent.

• **Tipton, (ATA):** Opposing the nonskeds proposal that mail pay rates be geared to freight rates, he pointed out: "Air freight rates for small shipments and short distances are high. If the average air mail pouch, which weighs 11.6 lb. were to be shipped as air freight over the average distance which air mail letters move, namely, 1170 miles, the cost to the Post Office Department would be $1.08 a ton mile."

A portion of advertising and publicity costs should be allocated to the cost of the mail service, he said, since this service as well as the other services "shares in the benefits resulting."

• **Carmichael, (Capital):** The "community approach" to subsidization may well prove beneficial in focusing attention on the fact that it is service to communities having a low traffic potential which creates the need for subsidy. But, he warned: "A tendency will develop to regard the subsidy allocation as the amount which may be saved by removing a carrier from a particular community. This poses an inherent danger to the stability of individual carriers and their efforts to achieve independence from subsidy. The subsidy allocated to a community does not represent the potential savings possible by abandoning service, and, in most instances, abandonment would simply aggravate the economic problem the carriers are attempting to solve."

Alcoa Strike

Aircraft and engine production faces snag in aluminum tie-up.

U. S. engine and airframe companies last week reported serious and growing production difficulties resulting from the six-week-old strike in the Cleveland foundry of the Aluminum Corp. of America, described as producer of approximately 75 percent of the nation's aircraft forging requirements.

Four of the five principal engine manufacturers–Pratt & Whitney, Curtiss-Wright, Allison division of General Motors, and General Electric–reported that the shutdown in the Cleveland plant's forgings was either immediately affecting their production schedules, or would cause curtailments within a few weeks. The fifth company, Westinghouse, said it was using other sources and was not seriously affected.

Adm. DeWitt C. Ramsay, president of Aircraft Industries Assn., last week passed on to top Air Force and Navy officials results of a poll of major engine and airframe military contractors on the results of the strike.

▶ **Industry Reaction**–"The effect is not yet critical on an industry-wide basis," he summarized, "but each day increases the seriousness of the problem. It is already critical for some manufacturers. It has caused an extension of delivery dates by other suppliers."

Seven major airframe companies replied to the poll: Boeing, Douglas, Convair, McDonnell, Republic, Northrop, and North American. Three reported they were not affected, two reported they are now trying to "hog out" substitute parts from raw stock, while others anticipated their stocks would last approximately a month longer.

The AIA report went to Dan Kimball, Navy Secretary, and Rear Adm. Thomas Coombs, Chief of the Navy Bureau of Aeronautics, and to Roswell Gilpatrick, Asst. Secretary of the Air Force, and Lt. Gen. Orval Cook, USAF Deputy Chief of Staff, Materiel. AIA also sent notification to Charles E. Wilson, director of Defense Mobilization.

Wilson's spokesman told AVIATION WEEK that Wilson was aware of the situation and concerned about it as affecting national defense production, but that he was not expected to take any immediate action until regular conciliation methods had been exhausted.

A delegation of Alcoa representatives met with U. S. Department of Labor officials in Washington last week to discuss the growing seriousness of the strike and urge further action towards its prompt settlement.

▶ **Strike Issue**–It was learned that as a result of the conference the U. S. labor conciliator in Cleveland, who has been handling negotiations on the strike thus far between Alcoa and the United Automobile Workers (CIO), had been asked to call another meeting between the representatives late last week, seeking a strike solution.

Approximately 2,400 workers at the Alcoa Cleveland plant went out on strike June 11 as a result of a dispute over a three-cents-an-hour raise, which the union wanted retroactive to last December. Alcoa has consented to the raise but opposes the retroactive feature.

▶ **P&WA Cutback**–Sample of the serious effect of the strike on supplies of such engine items as cylinder heads, crankcase sections, jet engine compressors, etc., was seen in the announcement of Pratt & Whitney Aircraft last week that it was cutting back 1,000 workers on assembly and test from 48 to 40 hours and would be forced to make more serious cuts in production if the strike continues much longer.

Officials said that the stockpile of forgings had dwindled rapidly since there had been no deliveries from the Alcoa plant since June 11. In addition to forgings, which Pratt & Whitney receives directly from Alcoa for cylinder heads and crankcase sections for its piston engines, the strike has vitally affected the East Hartford plant's major subcontractor, Thompson Products at Cleveland. Thompson Products supplies the compressors for Pratt & Whitney's J-48 jet engine, which are machined from forgings supplied by the Alcoa plant.

Aircraft Shipments

Shipments of complete civil aircraft, in airframe weight, came to 658,200 lb. during April, totaling 247 planes valued at $13.4 million.

The previous month 273 aircraft were shipped, valued at $3.4 million. Civil transport backlogs rose from 571 in March to 579 in April.

Civil plane engines shipped during April amount to 404 compared with 359 in March.

Employment in civil and military plane plants climbed 3 percent in April over March to 273,122. Engine plant employment rose 4 percent to 60,837.

Behncke Bumped But Battles On

Union head, deposed by directors, asks members for support as court acts to determine legality of ouster.

Controversy over control of the Air Line Pilots Assn., International, last week took a new turn when the "recalled" president, David L. Behncke, appealed to the membership for restoration to power, but simultaneously called for a withdrawal of a $2-million damage suit against other union officers and seven members of the board of directors which had voted to retire him.

Behncke's attorney, Leon M. Despres, told AVIATION WEEK that he was withdrawing the suit which had been filed in federal court. This action was believed influenced by a ruling of the Federal Master in Chancery appointed to determine the legality of the ouster, that the union would be put in the hands of the receivers unless the legal battle over its control was resolved.

Behncke, in a statement issued by Despres, urged the membership to go with him in opposing the action which had apparently ousted him. His statement said in part:

"I am ready to join the members in resisting any illegal raid. I do not and would not resign my office; but in the face of complacency I cannot, by myself, resist the physical incursion of the putsch into headquarters."

The bitterly worded statement attacked Behncke's opponents as "a small group of power-seeking men," and asserted that "the inner clique that directed the operation succeeded in obtaining the help of many sincere, but misguided, members."

The statement compared the ALPA coup with the "torpedoing of the democratic constitution of Germany," in which "Hitler, Goering and Goebbels obtained a 98.4-percent 'Ja' vote from the German people."

"If the clique of ruthless men is bent on physically taking over our headquarters, I cannot forever, singly, prevent the unlawful seizure," he said.

Behncke's statement and the decision to withdraw the suit came as an aftermath to action by a directors' meeting which voted to recall the veteran ALPA president and pay him full salary for life as retirement pay. Behncke had declared the meeting had been held illegally.

The controversy had affected negotiations for settlement of a United Air Lines Pilot controversy over the flying of the new Douglas DC-6B transports. Behncke had been representing the union in the controversy until he returned to Chicago to fight his ouster, and meanwhile the proceedings were suspended. With the dispute unsettled and unable to fly its DC-6Bs, UAL canceled 9,300 miles of its scheduled flying.

Elected to succeed the 54-year old Behncke was Clarence N. Sayen, 32, former Braniff Airways pilot, who had been executive vice president of ALPA until he was peremptorily fired by Behncke about 10 days ago.

► **One-Man Show**—Behncke had run a one-man show at ALPA during the 20 years since he founded the union. Old-timers recalled the first pilots' strike against Century Airlines, and other subsequent labor clashes in which Behncke's deep voice had spoken loud and long in behalf of his union. He had successfully quelled several previous attempted insurrections from the ranks

Voting on the question of Behncke's recall were 210 delegates out of a possible 228 (two from each of 114 pilots' councils in the union). A spokesman for the union reported the vote was 6,000 for Behncke's recall, with only 200 dissenting votes. (Votes are allotted on a basis of memberships in the councils.) The total membership of the union was given as approximately 9,000 pilots employed by 41 airlines.

At 5:30 am. last Tuesday, a message from Francis A. Spencer, ALPA secretary, was sent to Behncke in Chicago. It said:

"This is to respectfully inform you that you have been recalled from your office of President of ALPA, International, by action of the board of directors on Tuesday, July 17, 1951. Mr. C. N. Sayen has been elected to fill the vacancy left by your retirement. The board of directors deeply appreciate your long years of faithful service as founder and president of ALPA, international. The board of directors have voted as a token of appreciation for your work, an annual remuneration of your current salary for life."

Behncke's present salary is $15,000, which would be continued for life under terms of Spencer's message. The union had voted, several years ago, to provide $7,500 a year for life whenever Behncke retired, so that the action of the board doubled the previous retirement pay.

The board of directors voted also to reinstate four other union officials fired by Behncke within the last few days, including Larry Cates, Washington representative of the union.

► **Play-by-play**—Events leading up to the action by the full board of directors recalling Behncke culminated July 13 when a 22-man meeting of the 40-man union executive board voted to let Behncke keep his title as president, but to put a three-man committee in charge of union operations and deprive him of the right to disburse union funds. The executive board then issued a call for the full board of directors, delegates from the union's local councils, to meet in Chicago to approve the executive board's action.

The labor leader had called a meeting of the executive board last month (June 14-16) in an effort to head off the growing revolt. But the board "took control" of the meeting and voted establishment of a five-man investigating committee to report on the "ills" of the union's administration.

Behncke declared the board's meeting adjourned, but the executive board over-rode his decision and voted to recess to the July meeting. The union president claims that the July 13 meeting was illegal since the executive board had been adjourned and was not authorized to meet again.

Another result of the July executive board meeting was to authorize Secretary Spencer to sign union checks thereafter and to empower the three-man committee to collect union dues. These range from $6 to $66 quarterly, depending on the member's salary.

The First National Bank of Chicago, one of the depositories of the union, was notified that Behncke's authority to disburse union funds had been suspended.

Behncke was in Washington, representing the union in a labor conciliation hearing, when he learned of the executive board's action. He immediately flew to Chicago, went to union headquarters and declared the union action illegal.

Sayen, the man named as Behncke's successor, holds a master of arts degree in Economic Geography from Texas University and has been a pilot for 10 years, six of them with Braniff. At the time he went to ALPA two years ago as executive vice-president, he was a senior co-pilot at Braniff. He is married and has a six-year-old daughter.

Army Gets Stronger Voice in Tactical Air

Indication that Army is beginning to make its demands felt in matters connected with tactical aviation, suitability of aircraft and related equipment in military air transport was given in the establishment last week of a Joint Airborne Troop Board at Ft. Bragg, N. C., Maj. Gen. William M. Miley, USA, is named director.

The new board was established by Army Chief of Staff under authority of the Joint Chief of Staff and is charged with evaluation of equipment, joint tactics and techniques, and with developing doctrines and procedures em-

ployed by Army and Marine forces.

The JAT board is an outgrowth of the Army Airborne Panel recommendation in January, 1950, to establish such a unit to aid development of a modern airborne fighting force.

▶**Long Brewing**—The proposal had first been advanced almost three years ago by the Army to ease the problems of tactical air support. Army at that time had pleaded for a joint airborne test facility. Mission of the group was broad. It would have fostered advanced airborne techniques, doctrine, tactics, and development of equipment for airborne operations common to all three services. Air Force turned it down and the plan was shelved for the time being. (AVIATION WEEK Nov. 13, 1950).

The airborne center was originally constituted last year, but had no command status. At that time, General Miley was able only to "assist the Chief of Army Field Forces in discharging his responsibilities in airborne matters."

Aviation Facilities Suffer Flood Damage

Of aviation industry installations in the Kansas City flood area. Trans World Airlines appeared last week to have been most severely hit. By midweek, the carrier's Fairfax overhaul and modification center was deep under water and heavy damage was feared. TWA ferried out all flyable planes, but one Connie, three DC-3s, one 2-0-2A and one DC-4 had to be left behind.

The carrier employs some 2,000 people at Fairfax. It now plans to farm its Connie maintenance out to Lockheed Air Services, Burbank and overhaul DC-3s and DC-4s in New York. Engine work will be done by Grand Central Air Terminal, Airworks, Wright Aeronautical and Pratt & Whitney. Luckily, it has completed the major portion of its modification program, now has to handle mostly maintenance.

Temporary flight operations have been set up at Grandview where runway lights were installed to handle night flying.

Kansas aviation manufacturing operations seemed to have fared much better. Westinghouse reported that its Kansas City plant, making J-34 turbojets for Navy, was shut down but had suffered no flood or fire damage. The manufacturer ceased operations because a nearby water pumping facility was inundated.

Buick division of General Motors halted operations July 14 at its Fairfax plant, which is being converted to production of the Republic F-84F under license. From seven to nine feet of water covered the lower level of the big facility, but valueable records and engineering material were safe on an upper level not affected by the flood.

9½-Ton Bulldozer 'Bails Out' of C-119

A major obstacle to establishing and maintaining a combat airhead appeared eliminated with the recent disclosure by USAF's Air Development Center that a 9½-ton bulldozer had been successfully parachuted from a Fairchild C-119.

A main phase of airhead planning to which Army Infantry chiefs had heretofore objected was that planning strategy nearly always presupposed the capture of an airbase facility so that heavy and bulky equipment could be immediately landed in supply of the airhead.

▶**Army's Need**—"We must assume," said Army spokesmen, "that all enemy-held potential landing areas would be destroyed or subject to intense defensive action should their capture appear imminent."

What was needed, they said, was a capability for parachuting very heavy equipment, such as bulldozers and heavy weapons, into virtually inaccessible, and consequently lightly defended areas. Then, combat engineers should carry out whatever was needed for defense and supply of the airhead.

Meanwhile, ADC figured out a way to air drop the bulldozer as a single unit through the use of six 100-ft.-diameter parachutes. The machine is first supported on a wood and sheet-metal platform by "crash frame," series of shelf-like layers which crumple consecutively to absorb landing impact. The clutch housing and other vital parts of the bulldozer are protected further by heavy fiber-and-canvas pads.

▶**Extraction Method**—When the Fairchild C-119 reached the drop area in the recent tests, the bulldozer was pulled from the plane by the extraction method, sliding over a wheel conveyor and out of the fuselage to parachute downward.

The extraction method used at Ft. Bragg, N. C., where the C-119-bulldozer drop tests were conducted, operates as follows: 1. As the plane nears the drop zone, the pilot warns the crewmen who remove the bulldozer chain tie-downs leaving only three nylon shear-webs intact as a precautionary measure; 2. Five seconds before the drop zone is reached, the crew pulls a safety pin on the pilot parachute; 3. The pilot "on target" pulls a lever which releases a shot bag from the cargo compartment.

The bag pulls the pilot chute outward into the wind blast and it in turn yanks out the main extraction chute. As the extraction chute leaves the cargo compartment, three shear knives cut the shear-webs, leaving the cargo free. The extraction chute then drags the cargo and its six chutes out of the plane, separates the 100 ft. chutes from their containers and they open. As the main chutes open, extraction chute and container bags are automatically released.

▶**Extraction Future**—Test engineers at the Air Development Center believe that still larger equipment, both in weight and size, may be dropped by parachute using the extraction method. The first successful heavy-cargo parachute drop was completed at Wright Patterson AFB in 1946 when a 2,200-lb. field gun was dropped.

The problem of air dropping a bulldozer was one of the top ten projects chosen by Wright Air Development Center and it also carried one of Army's highest priorities.

Master Rod Bearing Failed in Cairo Crash

A Civil Aeronautics Board report on Trans World Airlines' Constellation crash near Cairo on Aug. 31, 1950, blames the accident on failure of the rear row master rod bearing of No. 3 engine during climb to altitude, and consequent fire in the right wing.

The aircraft turned back towards Cairo after the fire broke out, the No. 3 engine falling off about 3½ miles from point of impact. The aircraft struck the ground in a relatively flat position with the right wing a little low and in a slightly nose-down attitude. Gear and flaps were retracted.

No. 3 propeller was almost completely feathered, the emergency fuel shut-off valve to No. 3 engine was found in the closed position and the four CO_2 bottles located were discharged before impact occurred.

Since TWA and other R-3350BD1 engine operators had experienced a number of master rod bearing failures, the airline issued information to all pilots and flight engineers to be constantly alert for the unmistakable symptoms of such failures—high oil temperature accompanied by low oil pressure. Whenever such readings are observed, the report says, the engine should be feathered immediately.

Corrective measures taken as a result of this accident and previous master rod bearing failures were:

- Oil is changed every 400 hr. instead of merely being replenished between engine changes.
- TWA is service testing fine mesh oil screens to keep contaminants out of the engine.
- Longer master rod bearing feed tubes have been installed by TWA as an interim fix until installation of a new-type crank pin sludge plug.
- Consideration of development of an independent centrifuge to separate sludge from oil.
- TWA discontinued oil dilution.

FINANCIAL

Airline Merger Reports Increase

But despite more favorable atmosphere at CAB for consolidations, other factors make action soon unlikely.

Mergers among domestic airlines once again are coming in for intensified attention. The Civil Aeronautics Board is known to be strongly in favor of encouraging the consolidation of a number of air carriers so as to make the industry more self-sufficient without benefit of mail subsidies. And promoters in and out of air transport have advanced various proposals which would reduce the number of airlines.

In a significant reversal, CAB recently allowed Western Air Lines to retain certain profits from the sale of the Los Angeles-Denver route to United. The reason for this switch, according to the Board, is to encourage voluntary route re-alignments.

Among other things, CAB declared: "Improvement of the national air pattern has been for some time, and still is, a primary objective of the Board. . . . In order to avoid the danger of confining the present air pattern to a rigid mold, and to continue to encourage voluntary action by the carriers, we believe that the incentive of profit which may be derived from the sale of a route . . . should be preserved here."

▶**Long-Range Plan**—This statement may well be keyed to the Board's extensive studies in progress for some time designed to re-align the nation's airline map. This pattern is expected to be released in the near future.

Despite the desirability of strengthening the airline network through mergers, and the professed desire of CAB and industry to accomplish this objective, it remains highly unlikely that any major consolidations will be effected for some time to come.

The present atmosphere surrounding certificated airline life simply is not conducive to voluntary mergers. The free play of economic forces is not permitted to operate in the regulated air transport industry. There is no real incentive to negotiate desirable consolidations as long as a carrier has the right to expect sufficient mail pay, under stated conditions, to make past, present, and future operations whole.

▶**No Compulsory Power**—CAB just does not have the power to compel airlines to merge. It can, however, prod in both official and unofficial actions. Control over the award of mail compensation is a powerful weapon in this respect but the Board has been most reluctant to apply it in this manner.

Moreover, at present all of the airlines, with one exception, are experiencing highly profitable operations. This supports a strong case for sustaining the status quo of the individual carriers by their separate managements. The natural pressures for mergers arise during periods of financial stress.

In unregulated industries it has not been uncommon for strong units to acquire weak companies which could not weather the financial storm. But in the certificated airline industry, natural economic forces remain suspended. Holders of permanent certificates of public convenience and necessity, as long as they have the right to mail pay, can expect to remain in business. It was this factor which permitted a number of marginal airlines to survive the difficult postwar readjustment period.

Only if CAB applies pressures through a reduction in mail pay can there be a real motivating force operating for mergers and consolidations among the marginal or secondary airlines. The recently expressed CAB objective of a two-level structure within the industry composed of economically self-sufficient trunk lines and of local service carriers, can hardly be attained without rigid control of the mail pay spigot.

▶**No Easy Road**—Even if voluntary mergers were proposed, they would be headed for tough sledding. The airline merger path is a most intricate one, beset by many obstacles. Many have tried, but only in one minor instance has a bona fide merger been consummated since commercial aviation came into its own with enactment of the Civil Aeronautics Act of 1938.

For the trunk lines holding permanent certificates, the hurdles have been many and complex in attempting to effect some desirable combinations. Physical assets are not difficult to appraise. But placing a price on a "franchise" is a troublesome issue and many a proposal collapsed in the attempt.

Strong personalities of airline chiefs have also clashed in the showdown on who was to become head man in any merged systems. Then, once agreement at the top level is accomplished, proposals must obtain the sanction of the separate boards of directors and after that, approval from stockholders. Dissident groups can place any compromise plan in jeopardy.

The biggest obstacle remains in obtaining CAB approval. Board approval is required of any consolidation merger, lease, operating contract or acquisition of control of any certificated carrier. The Board must find that such proposed arrangement is in the public interest before it can become effective. The law directs the Board not to approve any arrangement which would "result in creating a monopoly . . . or jeopardize another air carrier not a party to the agreement."

It is this threat of impairing the interests of "another air carrier" which can prove particularly troublesome.

▶**PAA-AOA Example**—A recent example of some of the problems involved is present in the case history of Pan American's acquisition of American Overseas Airlines. This proposal was first launched in December 1948, and was predicated upon a quick, favorable decision. Instead, intense controversy ensued and it was almost two years before this acquisition was approved.

Precedents established in the course of previous merger attempts illustrate the formidable obstacles in the path of airlines attempting to combine. After approval by a special CAA examiner, the Authority (the Board's predecessor) in 1940 denied United Air Lines' application to acquire Western Air Lines. Main reason given was that the size and control of United would adversely affect the competitive situation in that area.

American Airlines attempted to acquire Mid-Continent Airlines through an exchange of stock. This proposal was turned down by the Board in 1946 on the grounds that it would merely add to American's bigness and, further, that no community of interest existed between the carriers.

▶**What Is "Desirable?"**—In recent years, the CAB has expressed encouragement of "desirable" mergers. No specific consolidations have been suggested in the past. Presumably, the "desired" mergers will be revealed in the forthcoming Board recommendations for a realigned airline route structure.

This in itself may serve the constructive purpose of settling well in advance of any formal proceeding the proposed Delta-Northeast merger, a combination of two carriers which do not now connect and which is viewed as a subterfuge to gain additional mileage and an entry into New York for Delta. Discussions recently held concerning a Northwest-National, along with other separate combinations, could conceivably take their cue from the forthcoming CAB suggested route pattern revisions.

—Selig Altschul

Martin Speeds Plans for B-57 Production

Conversion standards well along; first plane due late in 1952.

By Irving Stone

Baltimore—Two key airplane characteristics—simplicity and performance—prompted the Air Force to buy the English Electric Co., Ltd.'s Canberra bomber, which the Glenn L. Martin Co. will build here as the B-57A.

Our own planes aren't lacking in performance, but they do carry a load of government specified or furnished equipment and gadgets that, in addition to piling weight into the configuration, give a highly complex craft operationally and maintenance-wise.

And this adoption of the Canberra by our Air Force may mark the beginning of a new design and procurement concept for military craft—new from the point of view in this country, but not new for the British.

All of the foregoing is the conclusion of this reporter. Martin officials do not agree with the above interpretation. They say the Canberra purchase does not start a trend; furthermore, that our own planes are not unduly complicated, and that the AF's decision to buy the Canberra was based on the plane's range and maneuverability and the need for a night intruder.

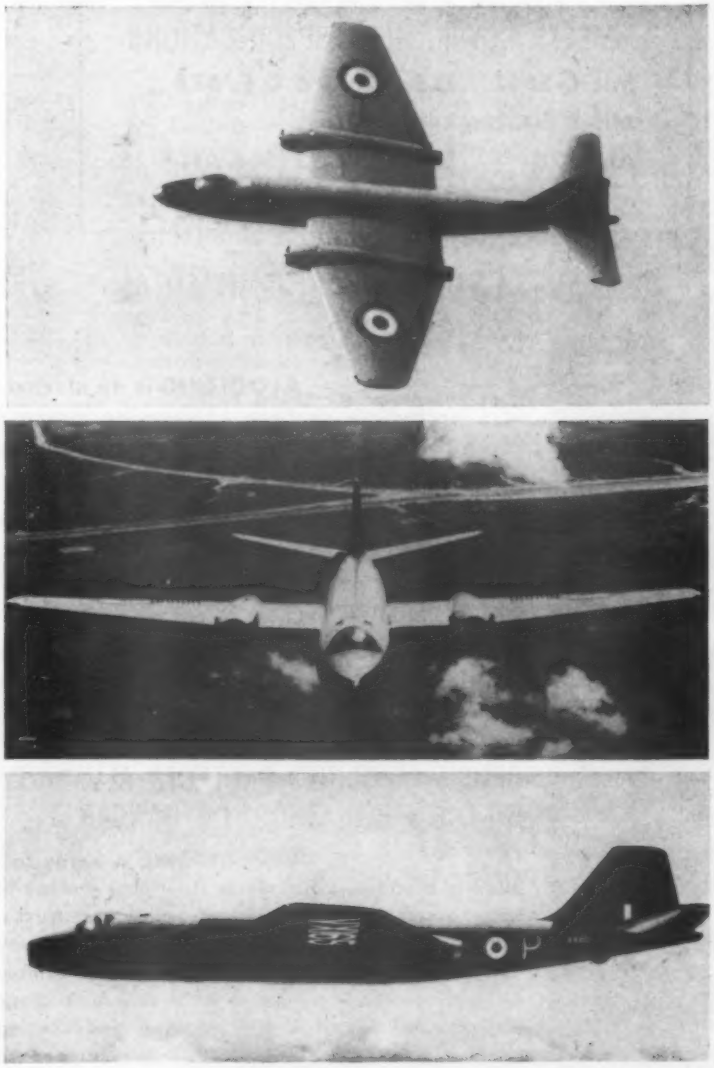
▸**Simplicity Evident**—Looking at the English Electric Canberra, it is at once apparent that the plane is the quintessence of simplicity—a deliberate and realistic simplicity clearly indicating that the British design and build a military plane on the basis that it is a weapon of war, and as such is expendable. Progressing from this fundamental theory the plane is built up incorporating only bare "essentials." While this eliminates a mass of complication for the ground crew and operational complement, it does render the latter more expendable in a sense.

In the Canberra, for example, there are no duplicate emergency systems, whereas our military planes for safety reasons add complication by introducing duplication (sometimes triplication) of systems.

And in many other respects, the Canberra's simplicity is evident:

• **To eliminate weight** and cost of self-locking nuts, bolts are peened over plain nuts on structures where disas-

Photographic Three-View . . .



CANBERRA B. MK. 2

Length	65 ft. 6 in.*	Dihedral, inner panel	2 deg.
Span	63 ft. 11.6 in.	outer panel	4 deg. 21 min.
Height	15 ft. 7 in.	Horizontal tail	
Wing root chord	19 ft.	area, gross	171 sq. ft.
Wing tip chord	7 ft. 8 in.	span	27 ft. 4.9 in.
Wing area (gross)	960 sq. ft.	dihedral	10 deg.
Aspect ratio	4.3	Vertical tail	
Thickness/chord,		area, gross	71.22 sq. ft.
root	12 percent	Landing gear	
Thickness/chord, tip	9 percent	tread	15 ft. 5 in.
Outer panel sweep-			
back	13 deg. 33 min.		
t.e. sweepforward	19 deg. 53 min.		

* B-57 length will be slightly longer to accommodate tail chute.

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sembly will not be required.

• **Bomb bay doors** are hung with two spring-loaded pins at the end of each panel.

• **Wing fillets are eliminated.**

• **Wood rubbing strips** are used wherever possible.

• **Torque tubes** are used throughout to eliminate cable problems.

• **There are no anti- or de-icing** systems.

• **To retain pressurization,** the inside surface of the bare metal is painted with a synthetic-rubber sealing compound for a "bag" effect, in contrast to tailoring the joints with bead sealing.

Martin's designers and production engineers appreciate the Canberra's simplicity and, as far as possible, will carry it over to the B-57A. (Generally speaking, every "improvement" added to a plane can start a spiral of cluttering complexity, additional weight, decreased performance, and poorer handling characteristics.)

▶ **Role Changed**—As the B-57A, the Canberra's role will be changed. Evolving from engineering which started back in August of '45, the Canberra was completed, except for some miscellaneous equipment, in July '48, and first flown in May '49. The prototype was intended to be a high-altitude radar bomber. The production version (B.Mk.2) came out as a medium-altitude visual bomber. There is some radar in the plane but it doesn't depend on this primarily.

There is a crew of 3—pilot, navigator and bombardier, the latter two seated side-by-side aft of the pilot. English Electric has built no more than about two dozen of the planes to date.

Martin will carry forward the B.Mk.2 version, but as an American tactical aircraft it will step into the role of a night-intruder bomber, with crew of 2—pilot and navigator-bombardier.

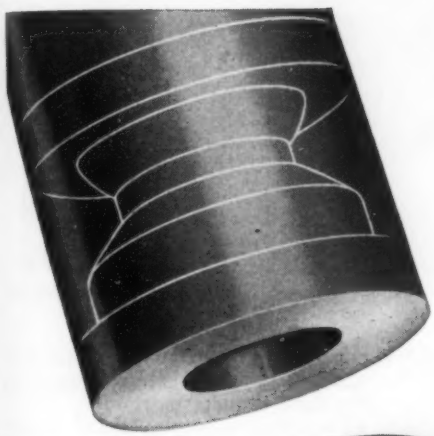
How many of the B-57s Martin will build has not been announced, but a guess may be hazarded from the company's published backlog figures. As of the end of February, backlog was $287 million. Martin received its letter of intent in March. In June, the published backlog had soared to more than $400 million indicating a substantial quantity of B-57s.

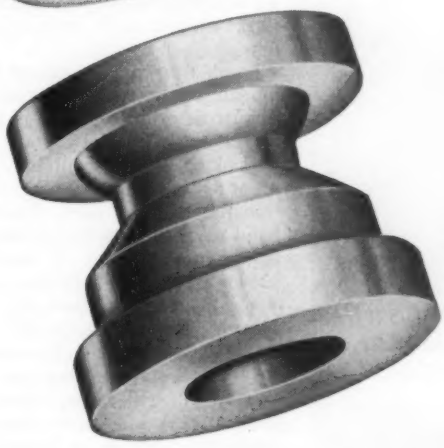
▶ **Changes Necessary**—The plane won't be built in Martin's Middle River facility but in one of the U.S. government plants used by the company in World War II.

Martin will adhere closely to the basic scheme of the Canberra in order to produce pretty much the "same beast" but some changes will have to be made in the B-57.

• To equip the plane for night-intruder service it will be fitted with gunsight and fixed forward-firing guns (Canberra has no guns) for shooting against

How hollow-parts makers can save steel now





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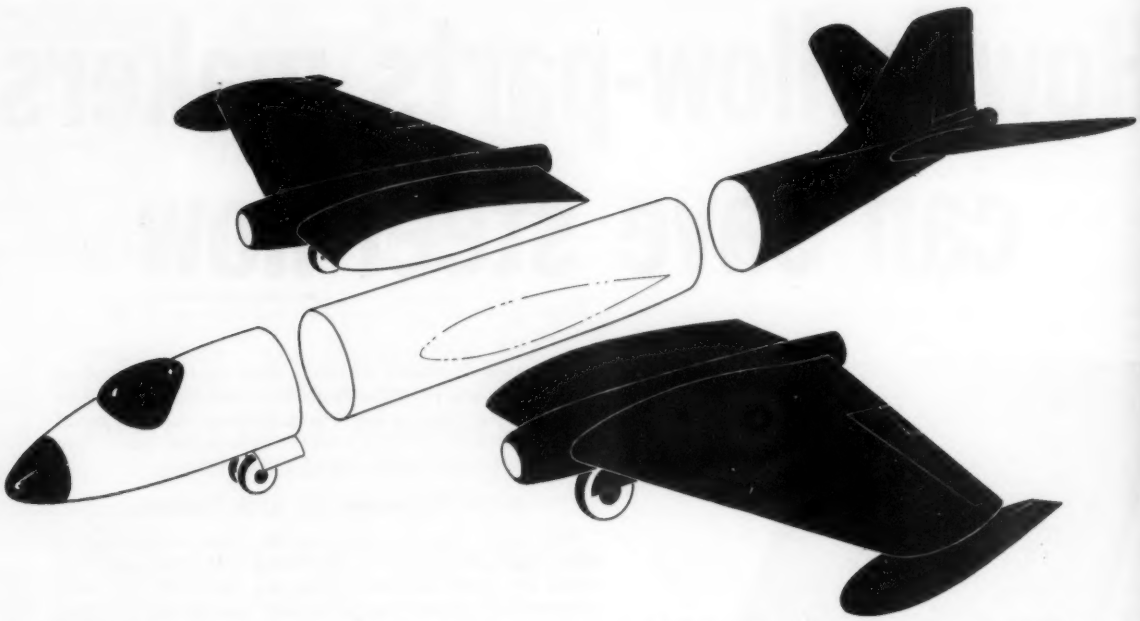
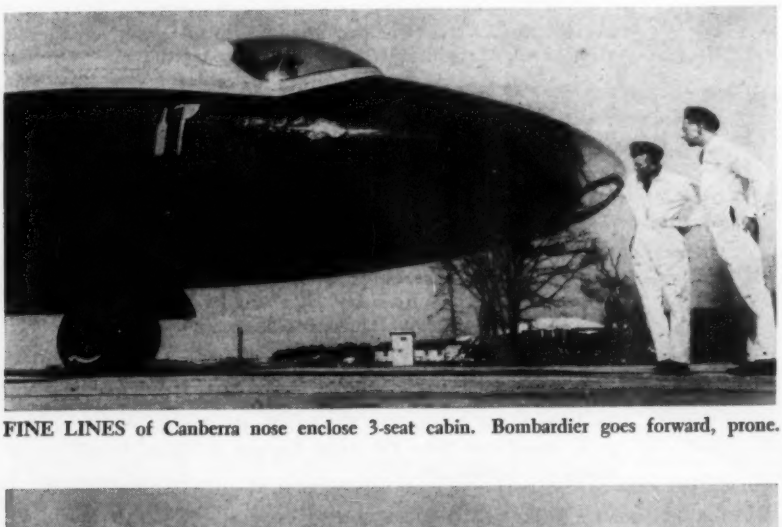
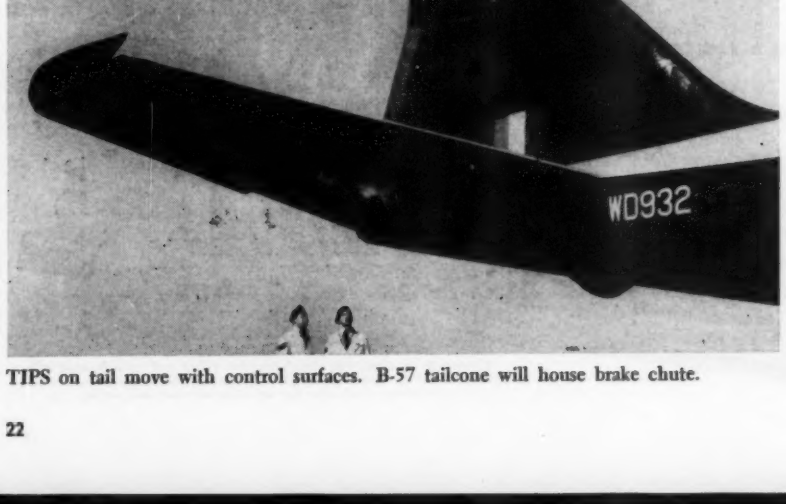


EXTENSIVE SUBCONTRACTING on B-57 is indicated by components in black—representing about 60 percent of plane's weight.



FINE LINES of Canberra nose enclose 3-seat cabin. Bombardier goes forward, prone.



TIPS on tail move with control surfaces. B-57 tailcone will house brake chute.

ground targets, and there will also be some electronic equipment changes for the night intruder function.

• For operation onto small and slippery runways, the B-57 will carry a tail-housed brake chute.

• Bomb bay will be redone to accommodate a larger number of bombs—smaller than those carried by the British in the B.Mk.2.

• Cockpit lighting will be redone for night flying. Standard A-N cockpit illumination will be used. Martin had a hand in developing this system and the first company plane in which it was used was the AM-1 Mauler.

• The Canberra's Rolls-Royce Avons burn kerosene, while the B-57 will fuel on JP-3, and this will mean changes in the fuel system. Bag-type (Mareng) rubber cells will be used instead of the integral tank scheme in the Canberra, vents will have to be larger to accommodate the vapor from the more volatile JP-3, and fuel lines will have to be enlarged in order to prevent vapor lock.

• A section of skin on the Canberra's aft fuselage top is hand-riveted in a long single piece. This procedure points up a fundamental difference in the production techniques of the two countries—Britain relies on the artisan, we rely on the machine. Martin will take this long stretch of skin, now too large for an automatic riveter, and break it down into shorter pieces so that the machine can accommodate it thereby stepping up mass production. This will mean redesign of some structural details and, accordingly, will mean a little more weight.

CARTRIDGE for starting screws into nose of engine.

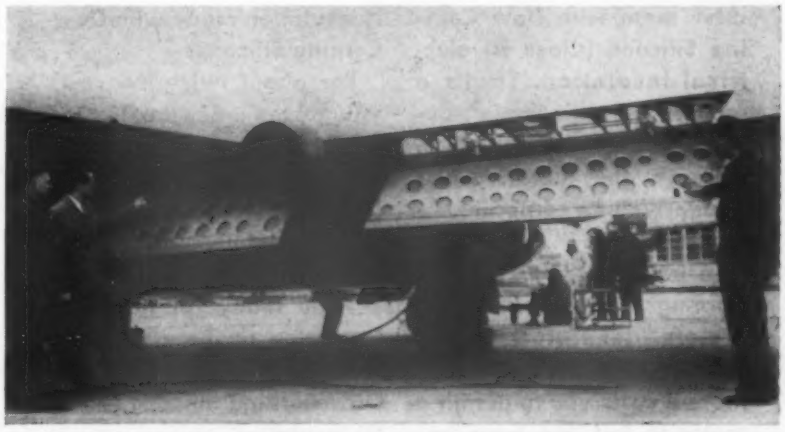
DIVE BRAKES are finger-type, located on top and bottom wing surface.

• The Canberra wing has a single spar makeup (leading and trailing edges have false spars) located at about 40 percent chord. This hooks on to a large hogged-out fitting (90 × 54 × 7 in.) that serves as the fuselage carry-through structure. Fabrication time for this unit is considerable. It will require a larger forging tonnage capacity than is available here, and the part eventually will be redesigned, but meanwhile the British hog-out procedure will have to be followed.

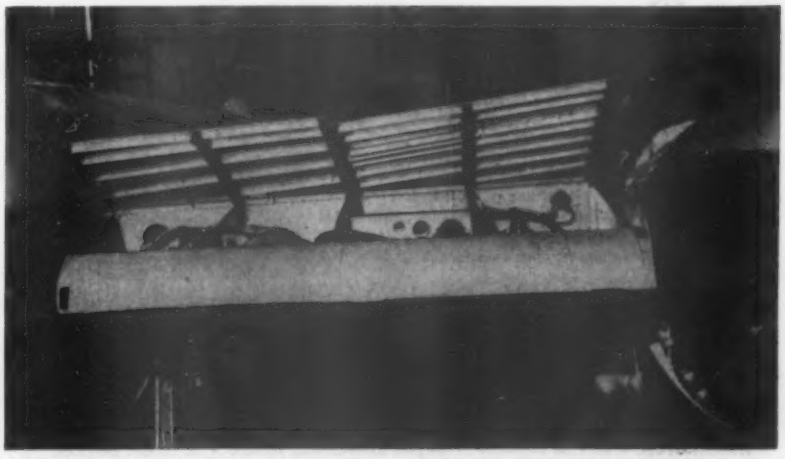
▶ **More Weight, More Thrust**—As a result of these changes, together with the increased tankage of the B-57 for greater range and heavier engines, the Martin craft may gross about 15 percent more than the Canberra. This increase in gross probably will not compromise the performance, because of the increased thrust of the B-57 engines. Selection of these powerplants has not been announced. But they probably will be the J-65 Sapphires (AVIATION WEEK, May 7).

Though Martin's contract for the B-57 stems from the Air Force, the project will be administered under Navy cognizance. The company concluded licensing agreements with English Electric in May, with the proviso that drawings were to be received in June. To date, about 98 percent of the drawings and templates have been received from England.

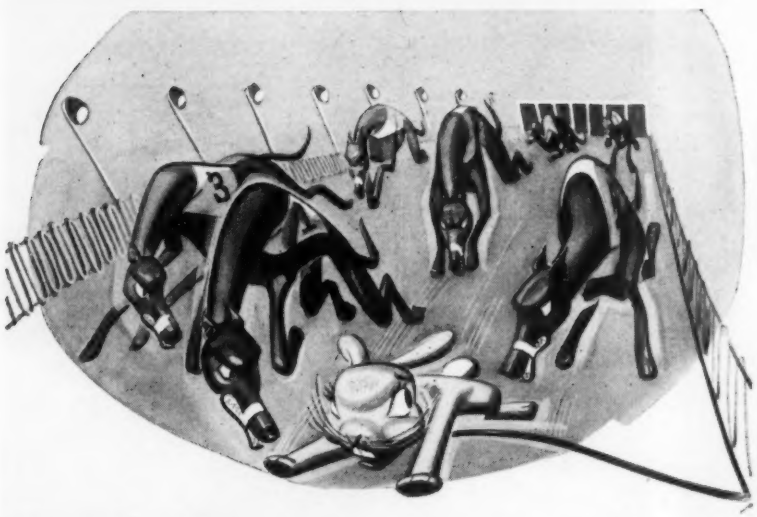
Martin had a team of engineers and production personnel at English Electric in April for about a month. Two permanent men are there now and English Electric has a resident engineer here and one of the original ground



LONG EXHAUST PIPE cuts flap span. Flap mechanism is exposed on rear spar.



LEADING EDGE hinges up to expose large cavity housing equipment and piping.



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crew of the first Canberra delivered (one more will follow).

Martin will receive certain plane parts from English Electric.

These parts will be used only if American counterparts cannot be immediately obtained, so the production schedule will not be delayed. Some English parts probably will be used for the first six or seven B-57s, where equivalent substitutions would be under very critical procurement.

For the remainder of the production run, American equipment will be selected to duplicate closely the Canberra's installations—this because the plane will have to be built according to a fast schedule and be supported from the U. S.

▶ **Conversion Big Task**—Martin already is well under way on the project. The tremendous redrawing job probably is the major factor from an engineering standpoint. Production-wise, company technicians don't contemplate any great problems, feeling that the B-57 will be a fairly straightforward task.

About 200 engineers are already engaged. Some are working on equivalent standards, some on new design work for those changes already known, and others are engaged on stress analysis. This engineering crew will climb to about 350 by late fall and will hold there for about a month. This will be the peak, and will then taper down to about 90 engineers for miscellaneous problems.

A manual for equivalent standards is now being prepared and will show the British part and its American counterpart side-by-side for guidance of engineering draftsmen and Martin's purchasing activity.

In all substitutions for the British standards, Martin will use existing A-N parts, wherever possible, without decreasing strength or increasing weight. Where direct substitution is not feasible, Martin will design new standards.

▶ **Standards Conversion**—The translation from English standards will be no easy job—a piece-by-piece task. The British use different sheet gages, rivets, bolts and screws, and the best compromise will have to be determined for each case. The ultimate result of Martin's work on this conversion phase may well point the way to a set of standards to be used in this country for work on other British craft, should they come along.

The British-type flush rivet is but one little example of what problems Martin will face. This unit has a shallower head than the flush rivet used here and allows installation with machine countersinking in thinner gage material than we can use with our rivet. We would have to dimple—a more complicated and expensive procedure. Therefore, to retain the same (approxi-

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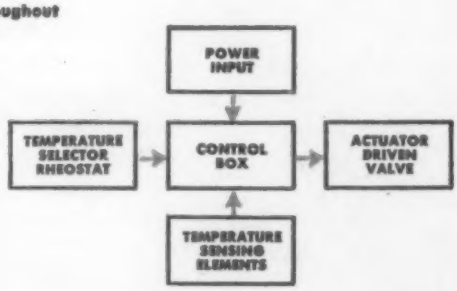

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Photo courtesy of *The Aeroplane*, London

Trans-Atlantic Teamwork

... The twin-jet Canberra, being groomed to bolster our tactical air power, is a working example of British-American cooperation. Originally designed in England as a high-altitude radar bomber, its flight tests proved it to be as effective at low-level operations. Now, a night intruder version of this light jet bomber will be added to our own Air Force, built by Martin under license from English Electric Co., Ltd.

The Korean conflict has re-emphasized the importance of tactical air power in low-level support of ground troops. To this mission, the Canberra brings exceptional maneuverability at high combat speeds, and at low levels and low speeds . . . ability to whip around like a fighter and turn with the best of modern aircraft . . . ability to carry a potent, destructive wallop!

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mate) skin gage as on the Canberra, Martin has developed a new standard –the rivet will have the same head height as the British unit. Tests have already been run to establish the suitability of the new rivet.

▶**Work Plan**–Here is Martin's get-ready and work schedule:

• **Release of raw material** quantities and purchased equipment will cover a period of about six months–for the first lot of planes.

• **Engineering release of drawings** will take about 22 weeks (30 weeks from start of preliminary engineering–layout and standard equivalent determinations).

• **Receipt of material** covers about six months and will run to about December for the first lot of planes.

• **Fabrication completion of detail** (production) tooling will span about six months. This will be for all planes.

• **Fabrication of first lot** of detail parts will cover about six months, and will start this winter.

• **Assembly tooling for bench,** major and final operations will span about eight months–will be for static and flight articles.

Except for release of raw material quantities, purchased equipment, and engineering drawings, the time periods will run concurrently.

The static test plane is scheduled for completion by late summer of 1952. The static proving should require about two months to insure clearance for the flight article, which will follow closely. The static tests will continue to prove out specification items and design data, but this phase of the static testing will be independent of the flight schedule since it does not relate to airworthiness characteristics.

The first few planes probably will resemble an experimental aircraft as would normally be built here–in large subassemblies. As the program progresses, these large units will be broken down into smaller units for high production. This is because the English job initially will be followed rather closely to preserve present makeup and performance. As the first few planes prove out, changes will gradually be made to accommodate the craft to faster production–if it can be determined that these changes will not lower flight performance.

▶**Subcontracting Extensive**–About 60 percent (by weight) of the aircraft will be subcontracted. Martin will build the main fuselage (nose and center section), the stub wing (carry-through structure), and will do the final assembly.

About five major subcontractors will fabricate the other main airframe components–wings, nacelles, aft fuselage, empennage, and bomb bay doors. Also subcontracted will be the nose cap,

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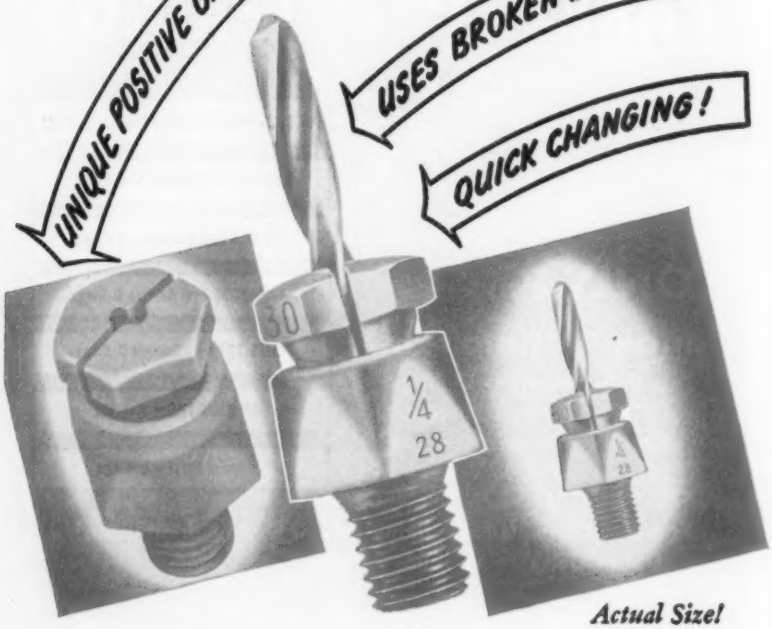

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pilot's enclosure, main and nose gear, fuel cells, tip tanks, forgings and castings, hydraulic cylinders and valves, electrical actuators, ejection seats, etc.

Subcontracted items will be made complete, with all the gadgets that go into them. The subcontractors will do their own British conversion tasks and any redesign necessary, but under Martin's supervision, as well as design and manufacture the production tools for the parts.

Martin's subcontracting program will be concluded this month, officials say.

Subs will be picked for proximity to Martin's manufacturing site, the sub's facilities and his know-how. Some undoubtedly will be in the automotive field. Stove manufacturers also are being considered because of their sheet metal experience and equipment, but will be selected only if they will do their own tooling.

▶ **Tooling, Employment**—The B-57 will require complete new plant tooling. Some will be obtained from government surplus, some from the machine tool industry. Cost probably will run over $10 million. The tools will be standard aircraft units, because the structure has normal makeup which does not require special setups.

The tooling program (machine tools) was set up at the beginning of February, actually before the contract was signed. Tools are being shipped in and stored now.

Production workers are being hired now for the B-57 project. Some are engaged in erection of mockups, proving out machines after their long storage period, and other miscellaneous tasks.

Martin's total factory employment is now 8,000, and by May of next year will climb to about 11,000. Meanwhile this 3,000 increase will be siphoned off other contract work that terminates and will be transferred to the B-57 project.

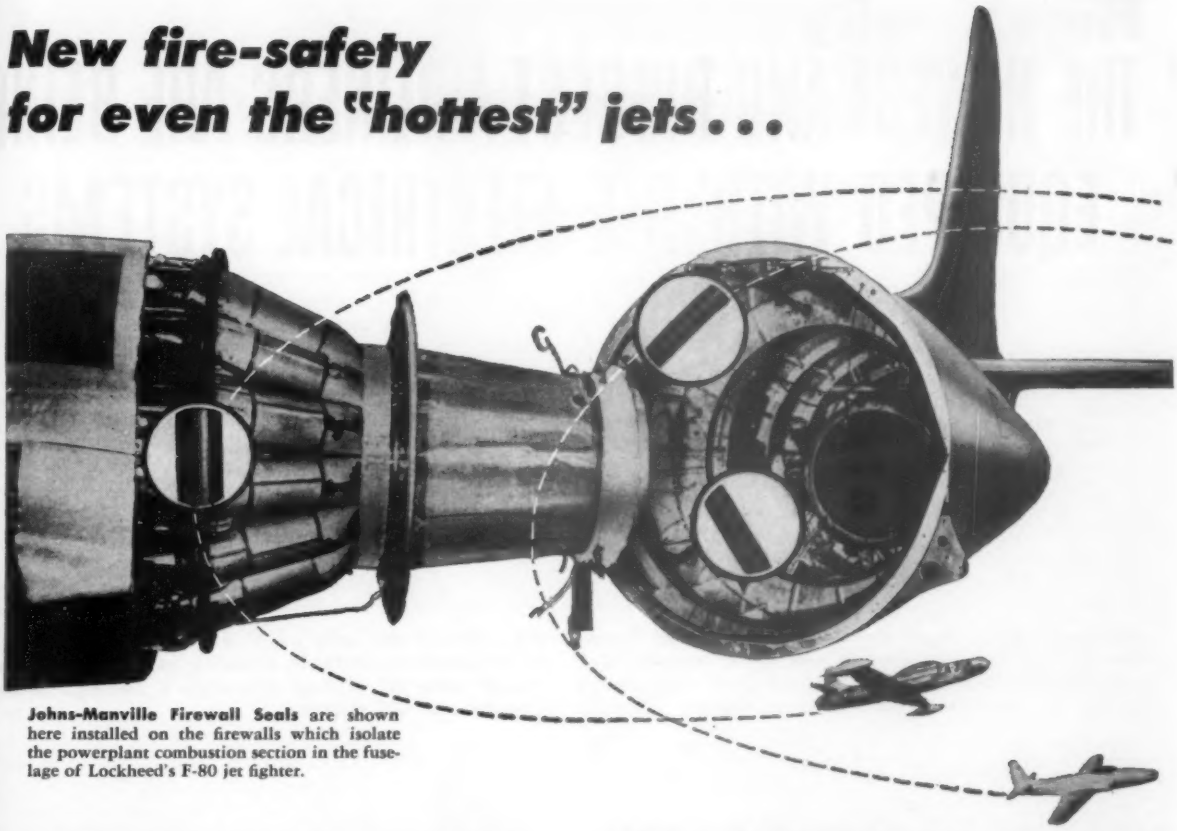
Top production force on the B-57 may run as high as 8,000, more than half of which will be on fabrication, depending upon rate of plane output.

Some manufacturing of B-57 parts —machine shop and sheet metal operations—will be done in the present Martin plant facilities. But this will be a very small portion of the work and will be fitted in where machine capacities are suitable and where the load factor will permit taking on additional jobs. All other work to be done by Martin on the plane will be in the new plant facility it will acquire.

About 28,000 production (detail) tools will be required—ranging from a 2-in. template to a 28 × 12 × 12-ft. fuselage center section assembly fixture.

Production changes from British techniques will be made initially

New fire-safety for even the "hottest" jets . . .



Johns-Manville Firewall Seals are shown here installed on the firewalls which isolate the powerplant combustion section in the fuselage of Lockheed's F-80 jet fighter.

with these Johns-Manville FIREWALL SEALS

To meet a variety of requirements, Johns-Manville Firewall Seals are available in 7 styles, with 2 types of cores: (1) an Inconel mesh core most suitable for sealing firewalls in the turbine flange area and other high temperature zones, and (2) a synthetic rubber core for sealing firewalls forward of the combustion chambers.

TO EFFECTIVELY SEAL the firewalls that isolate the exhaust and combustion sections from the compressor and accessory sections, most jet fighters in use today depend on Johns-Manville Firewall Seals. In actual service, these efficient gasketing tapes have proved their ability to reduce fire hazards caused by leaking fuel and oil coming in contact with hot gas surfaces.

Johns-Manville Firewall Seals are made in a number of styles that adapt them to virtually any firewall sealing requirement. They are constructed with a jacket of heat-resisting asbestos cloth coated with flameproof Neoprene. This jacket encloses a core of Inconel mesh or synthetic rubber tubing. The Inconel mesh core styles, for the higher temperature zones, have successfully resisted a 2000F flame penetration test for 30 minutes.

For further information about Firewall Seals and other Johns-Manville Products for the Aviation Industry, write for your copy of Brochure AV-1A. Address Johns-Manville, Box 290, New York 16, N. Y.

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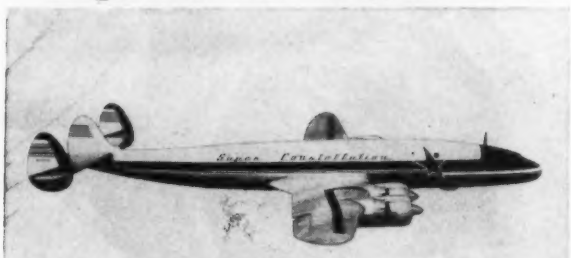
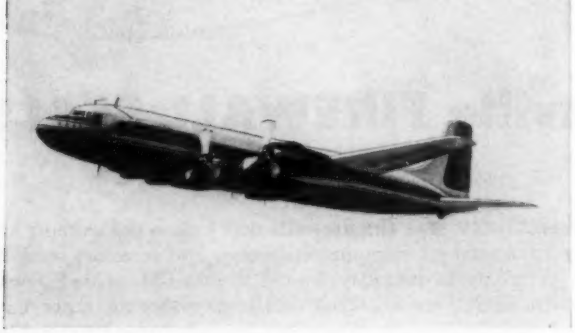
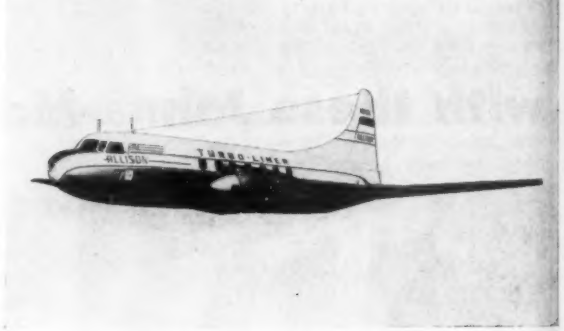


Lockheed's new model Constellations, and all Super-Connies use General Electric protective systems. G-E provides the fastest possible tripping of overvoltage faults—and freedom from nuisance tripping.

G-E provides the only positive method of isolating a faulty generator without affecting service. That's one reason why all of Pan American's Boeing "Strato" Clippers use G-E systems.



New Douglas DC-6B's being built for Pan American World Airways will be equipped with G-E electrical systems. G-E provides the most complete electrical protective systems ever placed in production for commercial transport-type aircraft.



The country's first turboprop transport—the Convair-Allison Turboliner—is equipped with a G-E electrical system. G-E systems are tailor-engineered to give the protection you need for ordinary or special applications.

The list of planes using G-E protective systems is a roll call of today's most popular aircraft. Are your planes listed among them?

One serious fault that damages electrical equipment in just one of your aircraft could cost you more than G-E protective systems for your entire fleet. Can you afford *not* to investigate?

For more complete information get the new fact-crammed bulletin GEA-5628. Telephone your General Electric aviation specialist or write General Electric Company, Section 210-16, Schenectady 5, New York.

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where they do not involve engineering changes, so as not to slow production schedules. Changes that will involve engineering changes will be made progressively in later aircraft. Martin planners know now what many of these changes are, but will have to watch for an appropriate time for introduction.

Out of these foreseeable changes that would normally be considered justifiable, perhaps only half will be made to obviate the necessity of building another static test plane (within the scope of the present contract).

▶**Optical Tooling**—Martin is favorably considering the use of optical tooling for alignment of the fuselage center section and probably will recommend optics to the subcontractors for the purpose of reducing the size of the master gages or eliminating them where possible. Use of optical tooling by the subs would simplify the coordination of parts they build that mate with Martin-fabricated components.

Martin will have its company representatives at each major subcontractor to guide it in the manufacturing process, to insure that the work will conform to Martin's aircraft standards. And sub's technicians will come to Martin for initial orientation.

Since the B-57 will be the first production jet aircraft that Martin is building, the engine noise factor will be considerable as the planes come rolling off the line. The plan is to construct a number (geared to production rate) of portable devices embodying a windtunnel arrangement with baffles and sound absorption materials, to deaden the sound of the jet exhaust, yet eliminate back pressure on the engine.

Hot Spray Finish

Douglas Aircraft Co.'s process engineers are saving 27½ hours in finishing AD-4 Skyraiders with a hot-spray lacquer. Booth time alone has been cut 9 hours, using present crews and equipment.

According to a report received by Hercules Powder Co., maker of the nitrocellulose ingredients from which lacquers are made, one coat of hot lacquer gives the required film thickness where two coats of finish were previously needed. This eliminates scuff sanding and the danger of sanding through the finish on rivet heads and skin laps. And the hot-spray technique gives a saving per plane of 2 gal. of lacquer and 8 gal. of thinner.

Hercules reports that tests have demonstrated better flow-out for the material, less tendency to sag, blush or orange peel and a smoother, glossier appearance. Superior characteristics were exhibited in salt spray and weatherometer tests.

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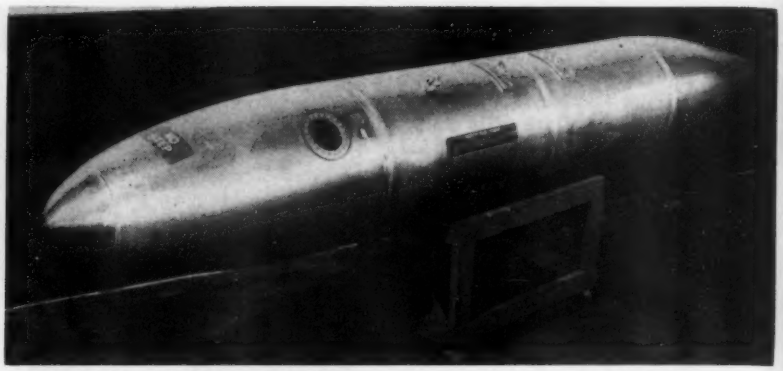
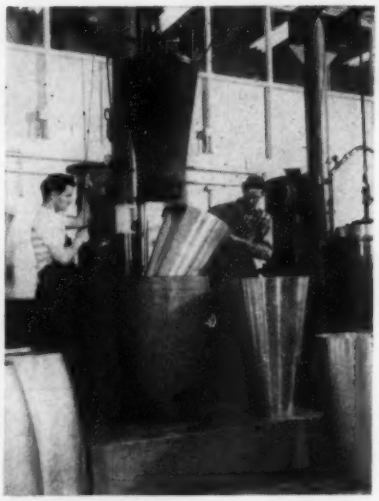


FINISHED FUEL TANK is culmination of much research by Vic Patushin Industries.



RUBBER BAG—the male die in Demarest process—hangs over aft section of 230-gal. fuel tank being fitted into Meehanite die.

LID IS LOCKED (on machine at right) and bag expanded by 400 psi. fluid pressure to form jettisonable tank part.

Expanding Rubber Forms Parts

New technique uses unique male die to force metal into complex contours for jettisonable fuel tanks.

By Thomas L. Self

Giving birth to a new manufacturing method can sometimes be painful. It can also be rewarding in the end.

A case in point is Vic Pastushin Industries, Inc. of Los Angeles, and its development of a technique for forming metal to complex contours by an internal expanding rubber die.

At considerable trouble the Patushin company departed from conventional processes to develop this method of hydraulic drawing for making fore and aft sections of jettisonable fuel tanks for military aircraft.

But now, the company declares, perfection of the new process saves 75 percent of fabrication costs over spinning.

The Pastushin company held a prime USAF contract for over 5,000 jettisonable tanks for fighter planes, and it wanted a method of metal forming that would be less expensive and quicker than usual methods.

▶**Old Ways**—External fuel tanks can be formed by hydro-press, using the rubber pad process; by drop hammer; by stamping press, or by rolling. These were rejected. Spinning, a metal working technique usually accepted as being the cheapest method for fewer than 5,000 parts, was also rejected as too slow and expensive.

Charles Demarest, tooling engineer, evaluated all the choices and decided on hydraulic drawing, using rubber, as the most efficient and economical way of doing the job. He felt he could design a relatively inexpensive piece of equipment that could form the con-

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From a single seater, open cockpit mail plane, to a vast fleet of passenger and cargo planes that have flown a phenomenal 599,320,000 revenue plane miles in 25 years is a record of which United Air Lines can be justly proud.

An important reason for this fine record is the continuing program of on-the-plane engineering tests that United began in its early days—tests to make certain that all equipment will deliver safe transportation under the most severe conditions.

Since Pesco first started to make hydraulic and fuel equipment for aircraft, Pesco engineers have worked closely with United Air Lines in the development of many of these products. Today, Pesco products are standard equipment on *every* plane that United flies.

Pesco is proud of this long association with United Air Lines. It is the kind of friendly, scientific cooperation that has helped to make aviation the world's fastest and safest form of transportation.

A few of the Accessories used on United's Fleet of Mainliners

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Mid-Continent Airlines Mechanic James Johnson uses a Snap-on Torqometer in tensioning studs on wheel of a Douglas DC-3 airliner.

one of the "musts" of good maintenance with Mid-Continent! High operating efficiency and safety are always positive reflections of good maintenance work. Good maintenance work calls for good tools. In Mid-Continent Airlines shops, as in many others, Snap-on Tools are consistently chosen. These fine *professional* tools help the ground-crews to do a better, surer job—faster and easier. Snap-on Torqometers, for example, make it a quick and simple matter to tighten nuts, bolts, studs—any threaded members—to the exact specified tension, right to the correct inch- or foot-pound. All Snap-on Tools (there are more than 4,000) are designed and built to help a mechanic do his best work. Aircraft maintenance and production executives: write for information on special tools in quantity runs.

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*Snap-on is the trademark of Snap-on Tools Corporation.

toured sections of the droppable tanks quickly and easily in a single operation. The metal would be stretched from cones or cylinders into elliptical, complex-contoured shapes.

The expanding mechanism consists of a ⅜-in. thick rubber bag of oil-resistant rubber, holding 40 gallons of fluid. Normal operating pressure is now 400 psi., but the bag will withstand 1,000 psi. if required. The die holder is a Meehanite casting weighing 3,500 lb., with 2½-in. wall thickness, and designed for over 1,500 psi. The male die is lifted in and out of the female die by an overhead cable, riding on pulleys, and with a counterweight at the other end. A high-pressure pump transfers fluid from the rubber die to the counterweight reservoir and back again through a relief valve set at 400 psi. Pump is gear-driven by a 2-hp 15-gpm. motor. Fluid may be passed in either direction by reversing the motor.

▶**The Operation**—The Meehanite die holder is cast to allow clearance of ¼ inch over the net size of the part to be formed. A wood pattern is then built to the size of the finished part, covered with plastic releasing material, and suspended inside the Meehanite casting cavity. Plastic resins are poured cold into the space between the casting and the pattern. The die then is immersed in a tank of water and kept at the boiling point for 60 min. to cure the plastic. It is allowed to cool in the water before being withdrawn. By means of this simple plastic liner, the die is made to the exact size, shape and surface desired. The liner eliminates scratches on parts from forming. Different configurations may be formed in the same dies merely by changing the plastic liner.

Briefly, here is how the process works. You take a sheet of .068 gauge 3SO aluminum alloy sheet, cut it to the flat pattern and roll into a cone or cylinder. Then you Heliarc seam weld it. At this point parts still have straightline elements.

Then you put the cone into the die. The rubber forming die, or bag is lowered on its cable until it fits snugly inside the sheet metal cone. A steel lid, 2½-in. thick and stressed for a 200-ton load securely holds the rubber forming die in place. Fluid is pumped into the bag from a reservoir until 400 psi. pressure has been attained. Expanding rubber will stretch-form the straight-sided cone into a curved cone configuration. At this point the pressure is instantly released. The part has been formed in the desired shape and contour. At the same time it has been given a flat section parallel to the axial plane, where the tank will be joined to the wing of the aircraft.

After the fluid has been pumped out,

(*Continued on p. 39*)

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In the Navy, too... every fighter, every bomber, every transport, is Hydro-Aire equipped. Hydro-Aire, Incorporated, Burbank, California.

MICRO Precision Switches on new Glenn L. Martin '4

Martin 404 passenger liner

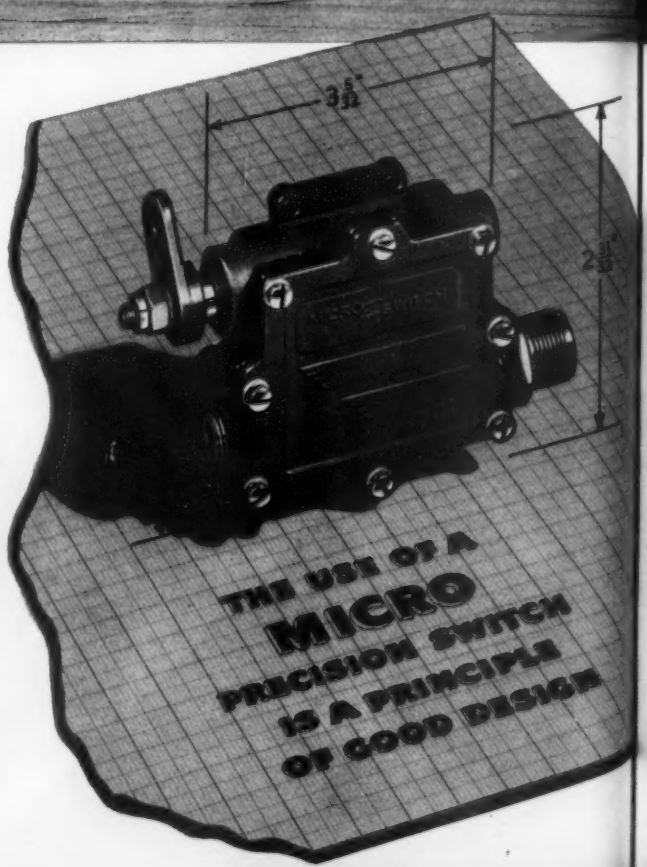
MICRO'S new Type LA enclosed switches are small, lightweight and sealed to operate under severe dirt, dust, ice or immersion conditions

The MICRO 2LA1 precision switch shown at the right is designed to answer the need for a completely sealed limit switch housing, with a rotary type actuator, for use in a wide variety of aircraft applications.

The switching units within the sealed housing are two AN3234-1 (MICRO Catalog Listing V3-1) single-pole, double-throw switches. The two switch units are operated nearly simultaneously when the external rotary actuating shaft is moved in either direction. The lever arm is adjustable through 360° to 36 positive lock positions in increments of 10 degrees.

The MICRO Type LA is also available with plunger type actuator (MICRO Catalog Listing 1LA1) which is similarly sealed and also provided with a scraper ring to prevent ice from damaging the "O" type seal rings.

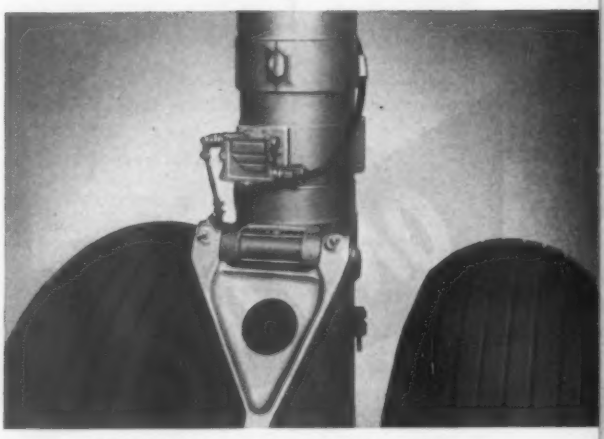
MICRO has a complete line of precision snap-action switches which conform to military specifications MIL-S-6743 and MIL-S-6744, and many switches designed to conform to Joint Army-Navy Specifications JAN-S-63. Write for Catalog No. 72.



A DIVISION INN

chosen as safety limits "404" passenger liner!

MICRO units on landing gear scissors lock reverse propeller pitch while ship is in flight; also lock landing gear in "down" position until ship is airborne.



MICRO 2LA1 precision switch located on main landing gear scissors.

Two unique features of MICRO 2LA1 precision snap-action switches influenced their selection by engineers of the Glenn L. Martin Company to perform these important functions in the new 404 liner.

The 2LA1 switch is mechanically linked to the landing gear scissor insuring positive operation in both directions. The switch is completely sealed by use of "O" rings within the housing, eliminating the use of rubber or synthetic boots. Thus, this ruggedly constructed switch gives precise, dependable performance under extreme conditions of shock, dirt, dust, ice, splash and immersion.

Many other new special switches for aircraft are on the drawing boards and in the experimental stages at MICRO SWITCH. Sales engineers are located at MICRO SWITCH branch offices to cooperate with you in the development of the switch to meet your most rigid specifications.

Closeup of MICRO 2LA1 installation showing the direct mechanical linkage by which the lever arm is driven in two directions to operate and release the switch.

MICRO MS SWITCH

FREEPORT, ILLINOIS

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The Pioneer Parachute Company is dedicated to one goal. The tireless research of many minds, the skilled precision of many hands, the endless hours of testing and developing all have a single aim and focus . . . to create thousands of parachutes that deliver the goods *where* they're needed most . . . *when* they're needed most . . . without accident, without damage.

Behind the mass cargo drops in Korea, where guns, jeeps, supplies, food, are parachuted down to our waiting troops with pinpoint accuracy, are the years of experiment, years of toil, years of experience that give Pioneer its rare blend of creative engineering ability and production "know-how".

From Pioneer's vast manufacturing plant to the distant fighting front go the parachutes whose ultimate mission is to carry new strength and new hope to our earth-bound fighting men below.

PIONEER PARACHUTE CO. INC.
MANCHESTER, CONNECTICUT, U.S.A.
CABLE ADDRESS: PIPAR, Manchester, Conn. U.S.A.

PARACHUTES MAKE THE DIFFERENCE!

(Continued from p. 34)

the die lid is unlocked and the bag lifted out.

▶**Development Problems**—Numerous problems confronted Demarest in building the equipment. No rubber bag of the desired specifications was on the market, so rubber was purchased and the bag built in the Pastushin plant. The casing of 60 shore natural black rubber was required to undergo an elongation of over 400 percent. Because of the developmental nature of the casing, it was not possible to buy it outside.

A contoured rubber bladder had to be formed in one piece without a seam. It was also impossible to buy this. The part was made in the Pastushin shops by spraying a form for 24 hours continuously with natural latex to generate a complex-contoured part with ⅜-in. wall, using the lost wax process.

Early parts made from 064 gauge 3SO aluminum alloy sheet were wrinkled like an accordion when formed. One of the big problems—and patent secrets—is how to stabilize the skin being formed to prevent column failure.

Another problem that resisted solution for a long time was how to seal the flexible rubber of the casing at the point of entry in an area where pressure exceeds 400 psi.

Though the Demarest process was designed especially for the production of forward and aft sections of jettisonable tanks, the process may be used to stretch-form other parts which require the stretching of metal from straight-line shapes such as cones and cylinders into forms with spherical contours in one operation. This includes flat sections which may be necessary for attachment of brackets, fuel lines and bolts. The process is particularly well adapted to the fabrication of tanks, cowling, and spinners. It is adaptable to steel as well as aluminum.

Pastushin lists these savings:

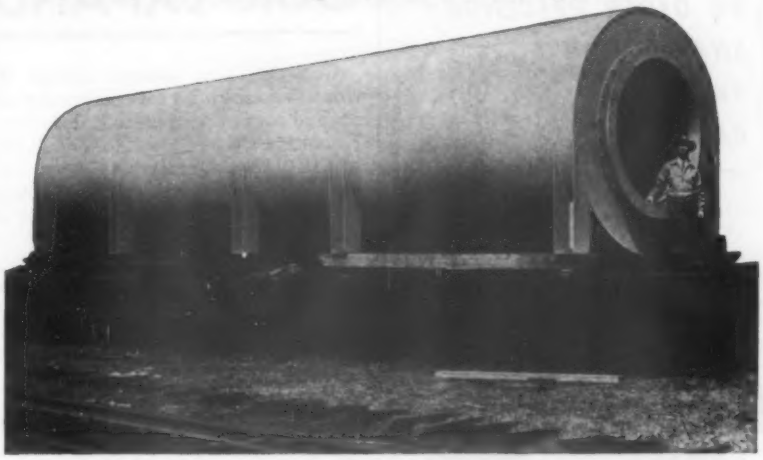
• **Time:** The nose section of the tank can be spun in 15 to 20 min. for each part under conditions of maximum efficiency. To make the same part by the Demarest process requires a little less than 3 min. for each part, and no degreasing is required. A part that has been Demarested requires only a wipe with a rag to be entirely clean.

• **Cost:** The use of the Demarest process results in a saving of 75 percent in fabrication costs over spinning.

• **Other Advantages:** Sections formed by the Demarest process require only one longitudinal seam weld. Other methods using stamped halves require two seam welds.

The expanding process gives high uniformity of skin gauge after forming. Spinning, because it is a hand operation, results in skin thickness variations.

A CARLOAD OF COMFORT
for men who ground-test jets



Here is another big Maxim Silencer ready to roll to the West Coast. Just as the one below is doing at the Lockheed plant in Burbank, this silencer will be used to eliminate the roar during jet run-up tests, so that the health and hearing of technicians can be protected during final adjustments and testing of the engine. Maxim is proud to have a part in making easier one of the great tasks undertaken by the aircraft industry today.

Consult **MAXIM**

THE MAXIM SILENCER COMPANY, 73 HOMESTEAD AVE., • HARTFORD 1, CONNECTICUT

Gentlemen: Please send me more information on jet engine silencing

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COMPANY _____

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_____

18MX61

THE HIGHEST RATED LITTLE D.C. SWITCH MADE

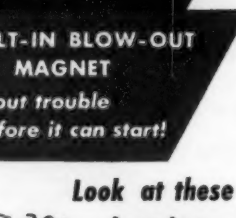
BUILT-IN BLOW-OUT MAGNET

Snuffs out trouble before it can start!

Look at these Amazing Ratings

TYPE D

17 AMPS—125 VOLTS D.C.
40 AMPS— 28 VOLTS D.C.



TYPE E

8 AMPS—125 VOLTS D.C.
30 AMPS— 28 VOLTS D.C.

FOR ULTRA HIGH ALTITUDE SERVICE

These tiny lightweight Mu-Switches with their high current carrying capacities are the answer to the aircraft engineer's prayer. They are correctly designed, strongly constructed and rigorously tested to assure complete dependability and instantaneous snap-action response. A built-in blow-out magnet prevents burned contact points—eliminates need for contact-bridging capacitators.

Mu-Switches meet rigid "AN" and other military specifications. Available with all standard types of actuators as well as enclosed in metal housings. Get facts now. Write.

MU-SWITCH DIVISION
ACRO MANUFACTURING CO.
CANTON, MASS.

SAY "MEW"

OUR EXPANDING INDUSTRY

Convair's new Guided Missile division is establishing an engineering annex and employment office in downtown Pomona, Calif., occupying about 15,000 sq. ft. The engineering annex will handle assignments pending construction of a plant on a 140-acre site in Southwest Pomona . . .

Beech Aircraft Corp. has had production of its new USAF T-36 twin-engine trainer assigned to Wichita. Air Force has awarded the company an official order for a substantial quantity . . .

North American Aviation, Inc., has signed a five-year lease with the City of Fresno, Calif., for hangar and manufacturing facilities at Fresno Air Terminal, covering approximately 130,000 sq. ft. The lease provides an option for additional 50,000 sq. ft. of space if needed later. NAA will employ about 300 at Fresno . . .

Hiller Helicopters is increasing building space at Palo Alto, Calif., from 36,000 to 110,000 sq. ft., including a new two-story administration and engineering building, separate metal coating and paint shop building and an extension of the firm's present plant . . .

Texas Engineering & Mfg. Co., Dallas, has received an additional subcontract for Douglas A2D Skyshark center sections, having a dollar value nearly equal to that of previously announced A2D work taken on by Temco . . . Has received also further contracts from Boeing-Wichita calling for fabrication, assembly and installation of equipment in the B-47 rear fuselage sections Temco is making for Boeing . . . Has received a 2,500-ton Erie hydro-press under $6 million facilities contract granted it by Navy . . .

Northrop Aircraft, Inc., plans to build a branch factory on a 33-acre site at Anaheim, Calif., to produce optical range finders for Army tanks. Factory will eventually employ 2,500 and occupy about 250,000 sq. ft. . . . Company is expanding its Hawthorne, Calif., aircraft manufacturing facilities 30 percent, encompassing an additional 450,000 sq. ft. and costing some $5.3 million . . .

Kaman Aircraft Corp., Windsor Locks, Conn., has leased 12 additional buildings to speed up production of copters for Navy. New facilities up number of buildings occupied by Kaman to 18 and raise floor space from 42,000 to about 100,000 sq. ft. . . .

Buick Motor division of General Motors plans to build a third large plant, near Flint, Mich., for production of parts, and subassemblies of the Wright J-65 Sapphire turbojet . . .

Solar Aircraft Co., San Diego, Calif., has expanded production so that it has organized into eleven divisions—among the new units being a research products division to have manufacturing and sales responsibilities in three Solar lines, the flux department, Solaramic department, and stainless steel foundry . . .

Luscombe Airplane Co., Dallas, Tex., has received additional contracts for Convair B-36 elevator subassemblies, which will require 100-200 more employes. Currently, Luscombe employs about 450 . . .

Ryan Aeronautical Co., San Diego, Calif., has received a $1 million order for jet engine components from Westinghouse Electric Corp., involving work with new, highly heat-resistant, stainless steel alloys. Ryan has also been given a $250,000 order from Convair for ceramic-coated exhaust systems to be used on Convair-Liners 240s and 340s . . .

Lockheed Aircraft Corp., Burbank, Calif., is equipping a feeder plant in Beverly Hills to build Super Constellation wing and tail sections. Employment is expected to reach some 300 at the 69,000 sq. ft. building, now used by the company as a warehouse . . .

Douglas Aircraft Co. has purchased four acres of land and 57,000 sq. ft. of buildings from Southern California Homes, Inc., at Bell, Calif., for use as an aircraft subassembly and honeycomb material manufacturing plant. Price of the acquisition was $250,000 and includes one of the largest heated bonding presses in the country. Employment there is expected to reach 400-500 . . .

Cessna Aircraft Co., Wichita, Kans., has received over $6 million in additional orders from Lockheed for fabrication and assembly of F-94 and T-33 empennage and aft fuselage sections . . .

Kaiser-Frazer Engine division's Dowagiac, Mich., plant is to be tooled for output of components for Wright R-1300 aircraft engines for the USAF. These parts will feed the half-million square foot Detroit plant, purchased from Continental Can. The engines are for the North American T-28 trainer . . .

Modglin Co., Inc., Los Angeles, Calif., is expanding facilities some 50,000 sq. ft. to process various metal forms and parts for aircraft . . .

Fairchild Aircraft division's $7 million expansion program at Hagerstown, Md., is well underway. A new production bay will increase present area by 165,000 sq. ft., bringing total production floor space to approximately 500,000 sq. ft. . .

Republic Aviation Corp., Farmingdale, L. I., N. Y., plans new construction to cost approximately $1.5 million including roofing in and build-up of a 40,000 sq. ft. area between the parts plant and tool shop wings, installation of a static test laboratory and modification of an all-metal hangar to take foundry equipment . . .

Seeger Refrigerator Co., Evansville, Ind., has been given a multi-million dollar contract by North American Aviation to build vertical and horizontal stabilizers for the F-86E Sabre in production at Los Angeles, Calif., and Columbus, Ohio . . .

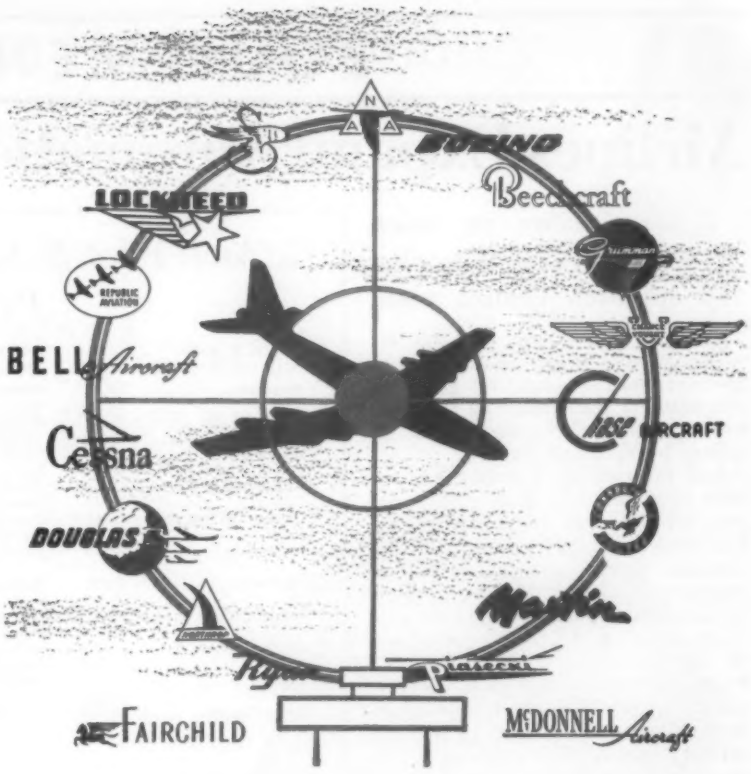
Wellman Bronze & Aluminum Co., Cleveland, Ohio, is spending $250,000 to expand its magnesium aircraft casting manufacturing facilities, adding about 50 percent to present capacity. The new facilities will be housed in a 25,000 sq. ft. plant being leased by Wellman . . .

Bendix Aviation Corp. has agreed to purchase the South Montrose Manufacturing Co., So Montrose, Pa., and will operate the 102,000 sq. ft. acquisition as a new division. Up to 700 workers will be employed at this location. Bendix has also agreed to purchase the Utica, N. Y., plant of Continental Can Co., consisting of 220,000 sq. ft. of floor space on a 12-acre tract, and expects to ultimately employ 2,000 people there . . .

Bill Jack Scientific Instrument Co. is negotiating with the government to build a 160,000 sq. ft. defense plant at Riverside, Calif., to produce electronically controlled aerial cameras and instruments . . .

Fkstrom, Carlson & Co., 1400 Railroad Ave., Rockford, Ill., is returning to building of machinery and tools for aircraft production. The firm is again offering its V-84 and V-109 radial arm Routerdrills for working in plywood, plastics and non-ferrous metals . . .

Pierce Governor Co., Anderson, Ind., is doubling its floor space devoted to making jet engine controls, with construction to be completed by July 1. about 300 employes will be needed.



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in the World's Toughest Game
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Time and again, the world's leading aircraft manufacturers have scored with ADEL products in meeting the severest requirements of both civil and military aircraft and helicopters. Since the beginning of World War II, ADEL has worked closely with prominent planemakers to develop and manufacture hydraulic control equipment surpassing the industry's most exacting standards.

Today, ADEL is intensifying its program of advanced research in aircraft hydraulics, and is solving the many problems born of the new developments in military aviation. ADEL offers the world's most complete line of aircraft hydraulic control equipment, including a full complement of hydraulic, fuel heater and anti-icing accessories, clips and line supports, PLUS an engineering service which assures the "solution to satisfaction" of your most critical hydraulic problems.

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MANUFACTURERS OF AIRCRAFT HYDRAULIC CONTROL EQUIPMENT

DIVISION OF GENERAL METALS CORPORATION • BURBANK, CALIF. • HUNTINGTON, W. VA.

CANADIAN REP. RAILWAY & POWER ENGINEERING CORPORATION, LIMITED

Airlines Expand Automatic Pilot Program

Most planes on order to have autopilots plus approach control units

Demanding no more pay and no minimum work week, 557 Bendix and Sperry automatic pilots are going to take much of the strain from air transport operations of the world's leading airlines by next year.

And the two big manufacturers are hotly contesting who shall sell the airlines the most and best robot service. Box score so far on the domestic and Canadian confirmed airliner autopilot programs: Bendix for 168 planes, Sperry for 202. On the foreign sales, Bendix is ahead with 129 planes programmed vs. Sperry's 58.

►**Current Totals**—Right now, the totals come to 370 domestic and Canadian airliners and 187 foreign airliners with automatic pilot installations already operating or programmed.

Of the total 557 U. S. and foreign airliners already scheduled for automatic flight, 296 either have already or will have automatic approach control.

Radio-beam approach control-hook-up with the autopilot flies the plane right on the beam and down to the runway threshold to land; it does this by transmuting off-course radio signals into immediate corrective action by the autopilot. The human pilot is not left out. He becomes more valuable than ever. He's relieved of the day-labor part of his job. He avoids much mental strain, too. So he can monitor his instruments and visual flight more efficiently than ever.

And any time he doesn't trust his robot autopilot, he can overpower it on the controls quite easily. Or easier still, he can switch off the robot's electric power.

►**The Big Two Domestics**—The two biggest domestic airlines have ordered complete fleet installations on automatic-approach couplers for their autopilots.

United Air Lines has two Bendix approach systems in and 62 on order for their 44 DC-6s, 20 DC-6Bs and 40 Convair 340s. American Airlines plans to install the Sperry auto approach in all its DC-6s and DC-6Bs.

United pioneered use of automatic pilots with approach control when it installed Sperry A-12 gyropilots on DC-4s back in 1946-47. UAL is going in for the Bendix PB-10 on the DC-6, but has decided to put A-12s on the 40 Convair-Liner 340s it has on order.

American starts installing Sperry A-12 gyropilots this fall in DC-6s as the entire fleet of Sixes is pulled off the line one by one during a nine-month re-

Auto Pilot & Approach Installation Programs

U. S. AND CANADIAN LINES	PLANE	EQUIP. MFG.	EQUIP. STATUS	APPROACH
American	DC-6B	Sperry	17 on order	Wiring for
	DC-6A	Sperry	3 installed	Wiring for
	DC-6	Sperry	49 activating 1951–52	Activating 1951–52
Braniff	DC-6	Sperry	6 installed	Installed
	DC-6B	Sperry	3 on order	On order
Canadian-Pacific	DC-4M	Bendix	3 installed	.....
Capital	L-749	Bendix	(7 specified)	(7 specified)
Chicago and Southern	L-749	Bendix	4 installed	Contemplated
Delta	DC-6	Bendix	7 installed	1 test instal. going in now
National	DC-6	Bendix	6 installed	1 test instal. this summer
			6 on order	.....
Northwest	B-377	Bendix	10 installed	Wired for and equip. on hand
Panagra	DC-6	Sperry	5 installed	.....
	DC-6B	Sperry	2 on order	.....
Pan American	B-377	Sperry	28 installed	.....
	DC-6B	Sperry	18 on order	.....
Slick	DC-6A	Sperry	2 installed	.....
	DC-6A	Bendix	1 installed	.....
Trans-Canada	DC-4M	Bendix	20 installed	1 oper. on supervised line; 1 instal. this summer; 18 wired for and equip. on hand
Trans World	L-749	Bendix	12 installed	.....
	L-749A	Bendix	20 installed	.....
	L-1049	Bendix	10 on order	10 on order
United	DC-4	Sperry	29 installed	29 installed
	DC-6	Bendix	44 installed	2 installed; 42 on order
	DC-6B	Bendix	20 installed	20 on order
	B-377	Bendix	5 installed	.....
	340	Sperry	40 on order	40 on order
FOREIGN AIRLINES:				
Aerolineas	DC-6	Sperry	6 installed	6 installed
Aerovias Brazil	DC-4	Bendix	3 installed	.....
Air France	L-749	Bendix	20 installed	2 instal. going in
	L-1049	Bendix	(14 specified)	Wiring may be spec.
Air India	L-749	Bendix	4 installed	.....
	L-1049	Bendix	2 on order	.....
Argentinas	CV-240	Sperry	5 installed	.....
Avianca	L-749	Bendix	3 installed	.....
BOAC	DC-4M	Bendix	22 installed	.....
	L-749	Bendix	6 installed	.....
	B-377	Sperry	10 installed	10 installed
BCPA	DC-6	Bendix	4 installed	.....
CMA Mexico	DC-6	Sperry	3 installed	.....
KLM	DC-6	Sperry	7 installed	7 wired for
	DC-6B	Sperry	7 on order	7 to be wired
	L-749	Bendix	17 installed	.....
	L-1049	Bendix	(10 specified)	.....
LAI	DC-6	Bendix	4 installed	.....
LAN	M-202	Sperry	4 installed	.....
LAV	M-202	Sperry	2 installed	.....
Orient India	CV-240	Sperry	3 installed	.....
Philippine	DC-6	Bendix	3 installed	.....
	DC-6B	Bendix	(2 specified)	.....
Quantas Emp	L-749	Bendix	7 installed	.....
Sabena	DC-6	Sperry	5 installed	5 installed
	DC-6B	Sperry	6 installed	6 installed
Scandinavian	DC-6	Bendix	14 installed	.....
	SAAB	Bendix	6 installed	.....
	DC-6B	Bendix	(8 specified)	.....
S. African	L-749	Bendix	4 installed	.....
Swissair	CV-240	Bendix	4 wired for	.....
	DC-6B	Bendix	(3 specified)	.....
Vasp Brazil	SAAB	Bendix	6 installed	.....

Note: Sperry figures do not report new airliner orders in which Autopilot is specified but not definitely ordered.

Sources: Eclipse Pioneer Div., Bendix Aviation on July 12; Sperry Gyroscope Co. on July 12.

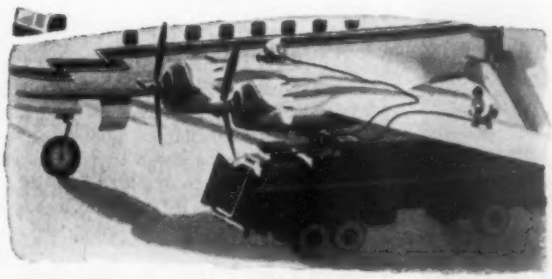
"For Maximum Power, Economy and Dependability"

American Airlines Specifies

DEPENDABLE

CHAMPION

SPARK PLUGS



Airline pilots know that the ability to get maximum engine power at a given moment is the greatest single safety factor they have. That's why 95% of the airlines fly with dependable Champions!

"*AMERICAN AIRLINES* requires spark plugs that give maximum power, economy and dependability. That's why American Airlines uses dependable Champion Spark Plugs for our fleet."
(signed) M. G. BEARD, *Chief Engineer*, American Airlines

Listen to the CHAMPION ROLL CALL . . . Harry Wismer's fast sportscast every Friday night, over the ABC network . . . CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

DROP TANKS
***Always* DROP**
when released by
WIGGINS breakaway couplings

Aloft, decisions must be translated into instant action without fear of failure. WIGGINS couplings insure positive sealing under full pressure range and in all vibration conditions.

Illustrated Right—Cross section of Wiggins automatic coupling which releases tanks on B-47B, B-36, B-50, B-52, B-45 and P-2V. Available in double or single self-sealing models, in shapes to meet installation requirements.

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STAINLESS STEEL FASTENERS . . IT'S ALLMETAL

ALLMETAL, Specialists in Stainless, Produce Stainless Products Exclusively

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Allmetal Stainless Fasteners meet the rigid specifications of the Aviation Industry. All types and sizes, "AN" or STANDARD, in stock. Stainless Phillips Recessed Head Screws and Specials available too. Complete facilities under one roof assures prompt delivery.

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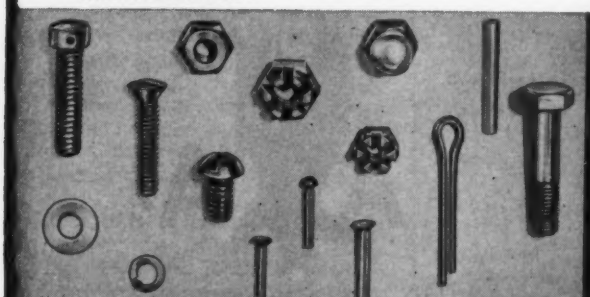

ALL MADE TO "AN" SPECS
• MACHINE SCREWS
• NUTS
• BOLTS
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STAINLESS STEEL FASTENERS
ALLMETAL
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33 GREENE STREET NEW YORK 13, N. Y.

work program. Every DC-6 will eventually get Sperry's automatic approach control coupler, as the program goes forward. Next year, American's autopilot and approach use will be the biggest operation of its kind.

American plans both automatic pilot and approach control in its newer, bigger DC-6Bs and freighter DC-6s. American aims to lower weather minimums once flight crews have mastered their mechanical slaves. **FLM.**

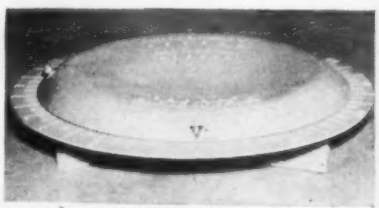
Ultra-Sonic Solder Bath Aids Tinning

(*Mc-Graw-Hill World News*)

A new ultra-sonic soldering bath for tinning small and complex-shaped aluminum parts has recently been introduced by Mullard Ltd. (new name for Mullard Electronic Products, Ltd.), Century House, Shaftsbury Ave., London, W. O. 2. The soldering bath acts as a complementary tool to an ultrasonic soldering iron developed by the same firm.

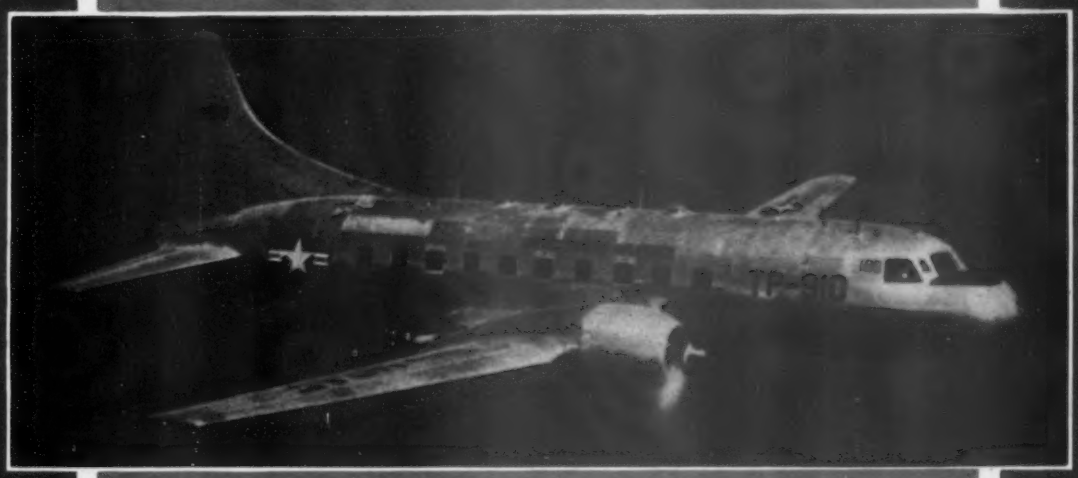
The device consists of a small soldering bath $\frac{7}{8}$ in. in diameter and $\frac{3}{8}$ in. deep, heated by a conventional resistance winding. Trick is that the molten solder is agitated by a magnetostriction transducer which produces ultrasonic frequencies.

Purpose of the untrasonic vibration is to break up highly refractory oxide films which normally form with ease on metals such as aluminum. The manufacturer claims that this is a much more satisfactory method than those formerly used and results in positive, uniform joints with a minimum of ef-



AIRPLANE SWINGER

This Type B-1 Wakefield aircraft turntable (Aviation Week, Apr. 9) has been installed at eight Naval Air Stations throughout the country and is being put in at Alameda and Los Alamitos NAS to simplify aircraft compass swinging. The B-1 has a diameter of 37 in., a capacity for 56-in. tires and loads of 50,000 lb. The Wakefield Engineering Co. of Coeur d'Alene, Ida., also makes a Type B-2 turntable with a 6½-ft. diameter and 100,000-lb. capacity. One is being installed at the Glenn L. Martin Co.'s Middle River plant. Another, in use at Fairchild for over two years, has not required one minute of maintenance in that time, according to Wakefield.



ANOTHER CONVAIR "FIRST"!

The USAF T-29, the navigational trainer version of the world-famed Convair-Liner, is rolling off the production line in steadily increasing numbers.

The T-29 "Flying Classroom" is the only plane in the U. S. Air Force that gives in-flight training to 14 students at one time, furnishing each with a full complement of radar and navigational equipment. *Records show that the Convair T-29 is turning out more and better-trained navigator-bombardiers in less time than ever before in air training history!*

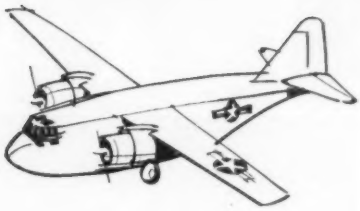
The T-29 is another "first" in a long line of famous Convaircraft and is proving again that top airframe design and production originate at Convair

IN THE AIR -- IT'S CONVAIR*

*REG. U. S. PAT. OFF.

CONSOLIDATED VULTEE AIRCRAFT CORPORATION

FORT WORTH, TEXAS
SAN DIEGO, CALIFORNIA



C-122 AVITRUC POWER PACKAGE PRODUCED BY ROHR FOR CHASE AIRCRAFT CO., INC.

THIS IS A POWER PACKAGE BUILT BY

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WORLD'S LARGEST PRODUCER OF READY-TO-INSTALL POWER PACKAGES FOR AIRPLANES

ROHR
AIRCRAFT CORPORATION

in Chula Vista, California. . 9 miles from San Diego

fort. No flux is required and soft solders may be employed.

The unit will operate from 100–250 v., 40–60 cycle current and consumes 200 watts max.

Dimensions are: soldering bath—6 x 6 x 9½ in. Weight—4 lb. Supply unit—9 x 10 x 12 in. Weight—40 lb.

Mullard is marketing the soldering bath in the U.S. and other foreign countries.

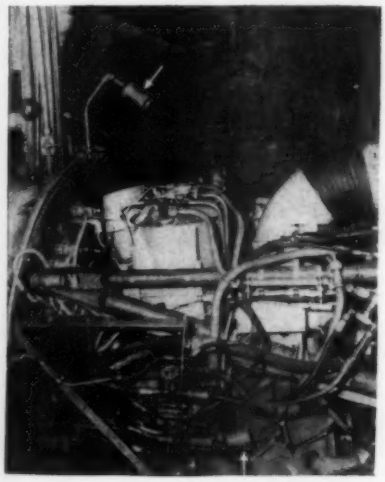
Gulf Makes New 'All-Temperature' Oil

A new, "all-temperature" oil, specifically developed for aircraft equipment operating under wide ranges of temperature and altitude, is being offered by the Gulf Oil Corp.

Designated Gulflite Oil 6, the lubricant operating limits are —90 to +210F. Gulf says the oil's outstanding characteristics are high viscosity index, low viscosity and low pour point.

Typical applications are those requiring material meeting specifications AN-06 or MIL-L-644—aircraft bearings; gyro and other instruments; photographic, armament and electronic equipment; flexible drives; anti-friction bearings and hinges, and hydraulic pressure transmitters.

The oil has excellent anti-corrosion and rust preventative qualities.

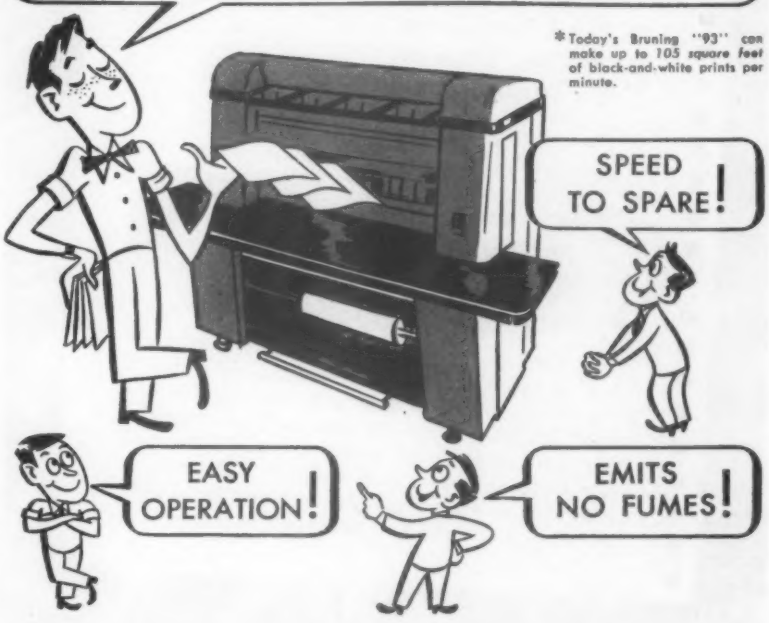


TEST CELL FIREFIGHTER

Two of the three newly installed carbon dioxide discharge nozzles guarding the accessory section of engines run up in Pan American World Airways engine test cells may be seen in above (arrows). They are connected to 16 50-lb. CO_2 cylinders arranged in two series of eight cylinders each, four for normal use and four for reserve. Manual release discharges the gas in case of fire to protect engine and test cell from damage. Fire extinguishing equipment was supplied by Walter Kidde & Co., Belleville, N. J.

STEP RIGHT UP AND GET YOUR PRINTS *ON TIME**

*Today's Bruning "93" can make up to 105 square feet of black-and-white prints per minute.



Outgrown your present black-and-white print equipment? Meet today's Bruning—it makes other machines look slightly horse-and-buggy. It's the talk of the trade!

TALK ABOUT VOLUME...with a Model 93 Bruning you can print up to 105 square feet per minute! And that's *finished* prints—prints that come out flat, dry, neatly stacked, and ready for immediate use.

TALK ABOUT EASY OPERATION... since Bruning BW machines *use no vapors and emit no fumes*, they require no special exhaust installation. You merely connect them to your electrical circuit and you're ready to make prints. And when a Bruning machine is rolling, all you do is set the desired speed and feed in the paper. That's all. No trained operator is needed.

TALK ABOUT EASY MAINTENANCE...all essential bearings are permanently lubricated—also self-aligning. The adjustable speed drive is a patented, stepless transmission that runs for years without attention. Parts that do require occasional attention are accessible in minutes.

TALK ABOUT FLEXIBILITY... Bruning BW machines can handle *any* black-and-white print jobs, and six different models offer a complete range of speeds and capacities. Too, there are 85 varieties of Bruning sensitized papers, films and cloths—far more than any other manufacturer offers.

SEE FOR YOURSELF the speed and ease of operating a Bruning BW machine. It's an eye-opener even if your present equipment is just a few years old. A complimentary demonstration, or our explanatory booklet, is yours for clipping the coupon.

The revolutionary, new BW Copyflex model.

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☐ I would like to see a Bruning BW machine demonstrated.
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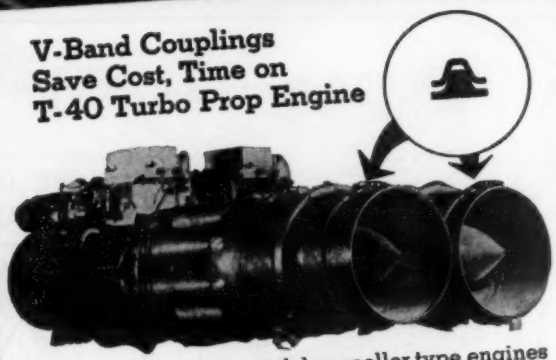
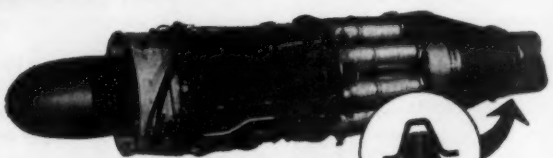
Company_____
Street_____
City_____ Zone_____ State_____

V-Band Couplings Save Cost, Time on T-40 Turbo Prop Engine



One of the most powerful propeller type engines ever cleared for flight uses Marman V-Band Couplings to attach engine to tail cone with a rigid, high-strength connection. This standard unit is an ideal Coupling for all types of flanged joints. A large selection of types and sizes is available to accommodate a wide range of temperature, pressure and strength requirements.

ENGINEERS' NOTEBOOK



(Photo courtesy of General Electric Co.)

Coupling Simplifies Attachment of Jet Engine Tail Pipe

A Marman V-Band Coupling is used to join the tail pipe to the tail cone on the J-47 Engine. Fulfilling stringent requirements, it must maintain a tight seal at all times and provide a structural connection capable of carrying heavy loads under high temperatures. Quick connecting Marman V-Band Couplings achieve significant savings in space, weight, cost and time.

Save cost and design time With Marman Standard Clamps for Special Applications

3

FOR INFORMATION, WRITE: DEPT. W-7

MARMAN PRODUCTS CO. INC.

940 W. FLORENCE AVENUE
INGLEWOOD, CALIFORNIA

NEW AVIATION PRODUCTS

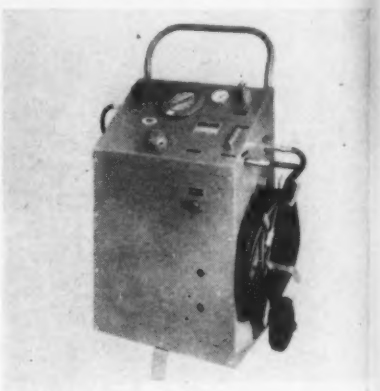
Motor Valve

A versatile, motorized gate valve for aircraft is the latest addition to the "hi-g" line of automatic controls developed by General Controls Co.

The motor valve, designated model AV-16, embodies quick-change features to facilitate maintenance and is offered in a variety of operating versions to meet your particular requirements. The unit, handling fuels and gases, is said to meet all applicable military specifications. These points are highlighted by the maker:

- **One-piece valve** body minimizes possibility of leakage.
- **Motor and actuator** assembly can be removed without disturbing valve as installed in aircraft.
- **Motor** can be replaced quickly by manually-operated handle, a special assembly equipped with bearings to carry cable rigging loads.
- **Motor assembly** with integral manual over-ride also can be used in place of regular motor installation.

With this latter attachment, the valve can be opened or closed both by motor or by hand. The manual over-ride provides complete disconnection between the motor and the manual operator, giving complete freedom for either operation. Address: General Controls Co., 801 Allen Ave., Glendale, Calif.



Hydraulic Power Unit

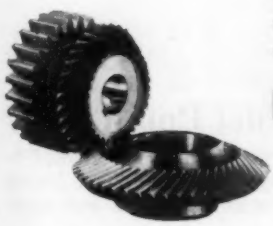
A compact, portable hydraulic power unit which can be rolled around the production line or taken right up to the aircraft for hydraulic component or system checks is being produced by Sprague Engineering & Sales.

The equipment provides pressures from 500 to 5000 psi. and low flows—about one gpm. at 2000 psi. It can be used for operational or proof testing of separate hydraulic components: or

of gears is a matter of fitting competent men and efficient machines to the job. One machine may be used to make a variety of gears. But the quality of some types it produces might suffer . . . or the cost might be higher.

• Here at BRAD FOOTE . . . in our own plant . . . we have an assortment of gear-making machines each of which is used to make gears within certain specifications. This enables us to turn out a volume of gears while positively controlling quality and price. Our highly skilled workers subscribe to and uphold the BRAD FOOTE creed—*"No one shares our responsibility."*

• So when you specify BRAD FOOTE gears—for use in your shop or on the equipment you sell to others—you can be sure of satisfactory performance.



BRAD FOOTE GEAR WORKS, Inc.

BIshop 2-1070 • OLympic 2-7700 • 1309 South Cicero Avenue
Cicero 50, Illinois

for operational or static testing of complete hydraulic systems in aircraft. Operation has been simplified, according to the maker.

Design is aimed to fit needs of manufacturers of small and large aircraft, makers of hydraulic components, airlines and service installations. Only thing not self-contained about this unit is that it depends on an outside source of compressed air to operate its air-powered hydraulic boost pump. The set normally comes equipped with a 25-ft. air hose. Also included are a reservoir (five-gal. capacity), 15-ft. hydraulic hose, pressure regulator, shut-off valve, relief valve, four-way selector valve and other necessary instruments and controls. The tester is provided with a single or dual outlet system. Address: Sprague Engineering & Sales, 1144 W. 135 St., Gardena, Calif.

Navigation Radio

A VHF communication and navigation radio set, dubbed the Avigator, Jr., and priced to fit pocketbooks of private flyers is being marketed by Mitchell Industries, Mineral Wells, Texas.

The set includes a six-channel, VHF transmitter. This is equipped with two standard crystals, 122.1 mc. for range stations and 122.5 mc. for tower. Other frequencies can be added without removing the set from the plane. Output of the transmitter is two watts. For reception, a tuneable VHF receiver with vernier control is provided. Output with headphones is 300 milliwatts, while with loudspeaker, it is four watts.

The set is available with or without omnirange equipment. The photo above shows an omni indicator mounted on the equipment. Without omni, the set is priced at $307.21, including tax.

WEIGHT • SIZE
LIGHTER WEIGHT plus
GREATER EFFICIENCY
EFFICIENCY
MODEL NO. MV-35
...MAROTTA VALVES
Through continuous engineering efforts, the weight and size of Marotta valves are constantly being reduced. At the same time, efficiency is being increased. For the lightest, smallest, and most efficient valves available, specify... Marotta Valves.
Write For Our Latest Catalog
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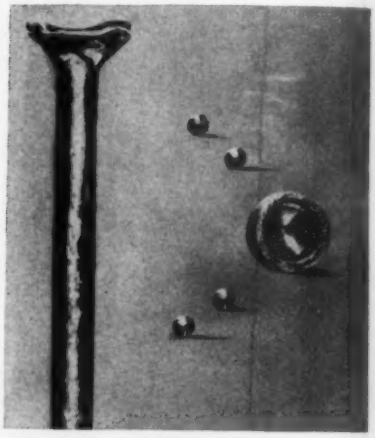
BOONTON, NEW JERSEY



'Liliput' Bearings

What may appear to be a railroad spike and some marbles in the picture above, is a common dressmaker's pin (highly magnified) and the smallest pivot ball bearings made in this country.

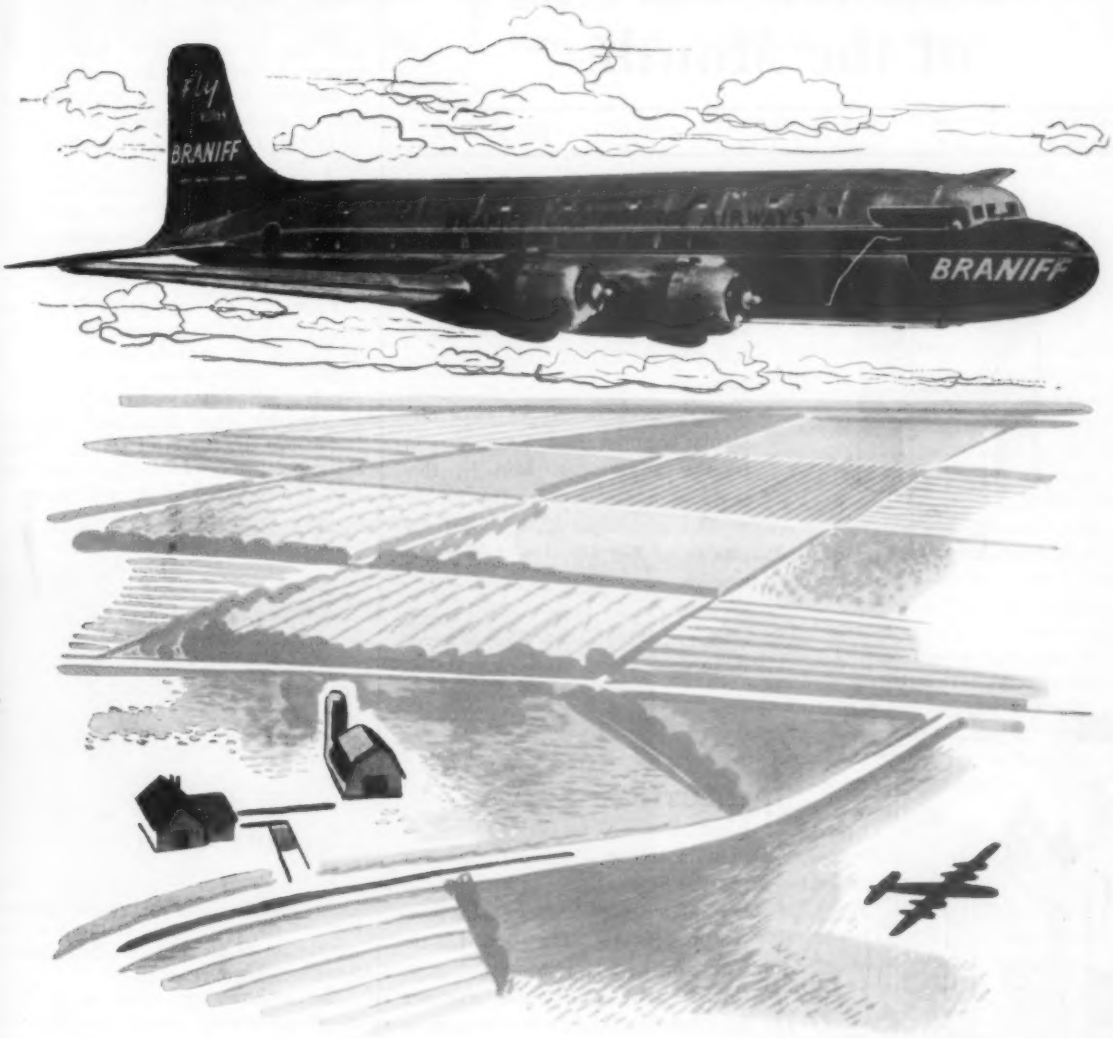
That's the claim of Miniature Precision Bearings, Inc., the manufacturer. The bearings—so small that to normal vision they are almost out of sight—should meet the approval of any miniaturization engineer or enthusiast.

The tiny bearings have an outside diameter of 1.5 mm. Tolerances are held to plus zero and minus .0002 in. with measuring instruments accurate to .000020 in. Balls are held in place by the pivot shaft and the raceway wall is designed so greatest mass occurs at points of greatest strain. This permits bearings to handle relatively heavy loads under severe conditions of shock and vibration, as encountered in aircraft instruments. The company's address is Keene, N. H.

New Fuel Pump

A fuel pump originally tailored to meet fuel system needs of the Boeing B-47 has been placed on the equip-

UP THERE WITH THE BIG NAMES, CHAPTER NO. 5



BRANIFF Airliners safer than ever—with SKYDROL

Braniff International Airways always is alert for advancements that mean greater safety and comfort for its passengers. That is why the Braniff DC-6 Airliners, that ply the airways of the Americas at a five-mile-a-minute pace, have Monsanto Skydrol in their cabin superchargers.

Skydrol, Monsanto's fire-resistant-type hydraulic fluid, eliminates the possibility of fires due to hydraulic line failures while planes are in flight or when being serviced. Thus, Skydrol protects passengers, employes and the multimillion-dollar investment in aircraft. Skydrol, a long-lasting fluid of high lubricity, also brings important *savings in maintenance costs.*

If you are interested in a *safer* hydraulic fluid that is efficient under all normal flight conditions, investigate Monsanto Skydrol. Write for technical information and a copy of the booklet, "*More Safety in the Air with Monsanto Skydrol.*" MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

ADVANTAGES OF MONSANTO SKYDROL

SKYDROL is fire-resistant—exceeds the nonflammability requirements of Aeronautical Material Specification 3150.

SKYDROL is a proved superior lubricant. In most critical cases, lubricity more than double that of other hydraulic fluids.

SKYDROL is stable at required operating temperatures and pressures.

SKYDROL is noncorrosive to aircraft metals and alloys.

SKYDROL is nontoxic—does not require special handling or protective clothing.

Skydrol: Reg. U. S. Pat. Off.

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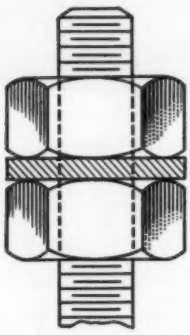
SERVING INDUSTRY . . . WHICH SERVES MANKIND

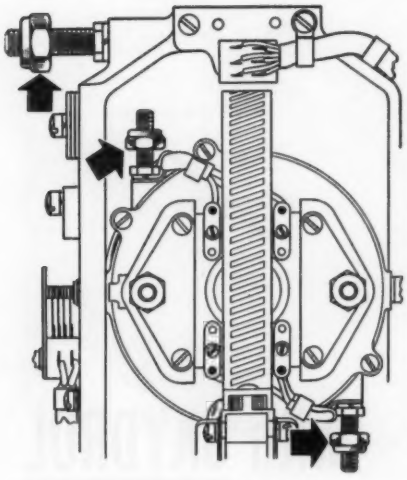
(Advertisement)

Fastener Problem of the Month

JULY, 1951

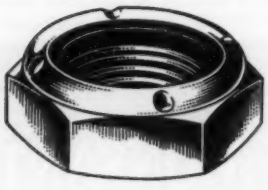


PROBLEM: When engineers at Lear, Incorporated, Grand Rapids, Mich., were designing the trophy-winning aircraft Autopilot, the balancing of the gyro mechanism presented some difficulties. In this sensitive instrument, positioning of gyroscope elements required fine accuracy and positive adjustment. Initially, this problem was solved by the use of weights held in place fore and aft by jam nuts. But adjustment of these weights was difficult, because the slightest change in position required loosening both nuts and drawing them up again in the new position.



(Actual size)

SOLUTION: By substituting an Elastic Stop Nut for the combination of nuts and weight, Lear engineers got the dual advantage of a balance that offered fine adjustment and positive positioning. The Red Elastic Collar of the Elastic Stop Nut grips threads tight and prevents the nut from turning because of vibration or impact—yet hair-fine adjustments can be made easily and exactly with a single wrench.



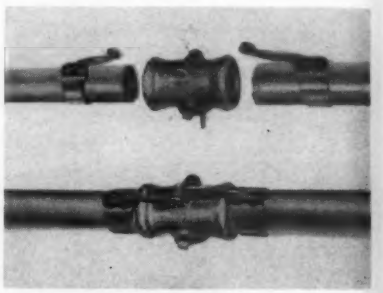
ESNA TYPE M

PRECISE POSITIONING of instrument assemblies or uniform bolt loading for major structural members are among the many fastening problems solved with equal ease by vibration-proof Elastic Stop Nuts. If you have a problem involving exact adjustment and firm grip, call in your ESNA engineer, or write: Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, N. J.

ment counter by the Romec division of Lear, Inc., Elyria, Ohio.

The pump, Model RG-9020, is designed to remove all fuel from the manifold after a refueling or fuel transfer operation has been accomplished. It is designed to deliver at least 100 gph. with a discharge pressure of 5 psi. at 17,000 ft. altitude when turned at 3500 rpm. by a 27v. d.c. motor. It has a capacity of 150 gph. when equipped with a 115v. a.c., 400c. motor operating at 4000 rpm. and 5 psi. pressure. Thus equipped, it is designated Model RG-9440.

Featuring explosion-proof design and equipped with a radio noise filter, motor and pump are suitable for operation at extreme temperatures, says Romec. Pump is self-priming and no lubrication is required other than fuel pumped. It can run dry for short periods. Pump is the positive displacement, rotary vane type and weighs 3.25 lb. with motor.



Pipeline Couplers

New "Quick-Lok" couplers for joining pipelines might be used to advantage by the military to help speed the setting up of airbases or other installations in advanced areas.

Tests show one man, using these couplers, can lay about one-fifth mile of pipe in an hour, according to the maker, R. M. Wade & Co. Described as a major advance in industrial pipeline handling, they are said to be useful wherever liquids, air or gases are conveyed in pipes– and especially where speed and portability are major factors.

Couplers are made of aluminum alloy, are designed to withstand pressures up to 300 psi. They permit pipes to be connected or disconnected without tools. Another installation advantage is that they are built for use on plain-end pipe. Special "Loks-in" gaskets are designed to assure positive sealing and are supplied with or without a self-draining feature, depending on requirements. The couplers carry some of the features of couplers used with portable irrigation equipment. These latter have been produced for a number of years by the Mulnomah Iron Works, manufacturing division of Wade. Address: R. M. Wade & Co., 106 SE. Hawthorne Ave., Portland, Oregon.

MONEL

A general-purpose, corrosion-resisting alloy for applications that require a hard, tough, high-strength material

Monel® is a solid-solution alloy which combines high strength, ductility, fatigue strength, and toughness, with excellent resistance to corrosion. Its properties can be changed by cold working but it cannot be age hardened. It is slightly magnetic at room temperature and is non-magnetic above 110°-140°F.

The principal mechanical properties of Monel are:

● **Tensile Properties:** Hot-rolled Monel has a *minimum* yield strength (0.2% offset) of 25,000 psi., a minimum tensile strength of 70,000 psi., with an elongation (in 2 in.) of approximately 45%.

SHEAR STRENGTH OF MONEL RIVET WIRE

Temperature of Test, F.	Shear Strength, psi.	
	Soft Temper	1 B&S No.
Room	48,500	54,500
½ hr. at temp. before testing		
600	45,000	52,000
800	37,000	47,500
1000	29,000	38,000
24 hr. at temp. before testing		
800	38,500	49,500
1000	30,500	38,500

● **Toughness:** Due to the coexistence of high ductility and high strength, Monel is one of the toughest alloys.

Charpy impact valves vary from 220 ft.-lb. for hot-rolled Monel, to 150 ft.-lb. for cold-drawn.

● **Spring Properties:** Monel spring wire can be used under corrosive conditions and at temperatures up to 400°F. For wire sizes heavier than 0.057-in. diameter, design of springs is based on a torsional modulus of 9,500,000 psi. and stresses of 45,000 psi. for average service, and 35,000 psi. for severe service.

● **Endurance Limit:** In rotating beam tests of polished specimens at room temperature and 10,000 r.p.m., Monel (cold-drawn, as-drawn) showed an endurance limit for 10^8 cycles of 40,000-47,750 psi.

● **Low-Temperature Properties:** Monel has excellent properties at sub-zero temperatures. Data shows that strength increases, without appreciable change in ductility, hardness or impact strength. Cold-drawn Monel at −110°F. had a tensile strength of 117,450 psi., a yield strength of (0.20% offset) of 100,850 psi., and charpy impact strength of 178 ft.-lb.

● **Working Characteristics:** Monel can be forged in practically any shape forgeable in steel. Recommended temperature for heavy-hammer forging and drop forging is 2150° to 1700°F. Hot working should be avoided in the range of 1700° to 1200°F. (If it is unavoidable, only light hot work should be done.) Monel behaves similarly to mild steel in mechanical cold working, as in cupping, drawing, swaging, die-forging, power hammering, bending and forming. Monel's high strength limits manual operations, such as spinning, bumping, and hand hammering, to easy shapes. Heavy work can be done by hand only with frequent anneals. Monel is satisfactorily machinable but due to its toughness, cutting speeds are somewhat slower and feeds lighter than those for mild steels. It can be joined by the usual welding, brazing, and soldering processes.

● **Corrosion Resistance:** Monel is highly resistant to attack by most commonly encountered corrosives, including neutral and alkaline salts, salt water, mineral acids, alkalies, organic acids and compounds, and wet and dry gases.

● **Forms Produced:** Monel is supplied in most commonly used mill forms—rods, hexagons, squares, rounds, flats, strip, sheet, seamless tubing, wire, welding materials—and in a variety of finishes and conditions. It is also produced in sand, centrifugal and precision casting.

FOR ADDITIONAL DATA

Write for your free copy of Technical Bulletin T-5, "Engineering Properties of Monel and 'R' Monel." It contains all essential engineering information on these alloys.

For help on specific metal problems, write directly to Inco's Technical Service, outlining your problems.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

INCO TRADE MARK

Nickel Alloys

MONEL® • "R"® MONEL • "K"® MONEL • "KR"® MONEL • "S"® MONEL
NICKEL • LOW CARBON NICKEL • DURANICKEL®
INCONEL® • INCONEL "X"®

WILCOX...

CHOICE OF TWA

WILCOX TYPE 96D TRANSMITTERS CHOSEN FOR *TWA's* GROUND STATION INSTALLATION

AT ROME

TWA's far-flung empire requires the finest communications network that research and precision manufacturing can produce. TWA has long been a user of Wilcox equipment, and Wilcox is proud to be chosen again as TWA expands and improves its world-wide services. The Wilcox Type 96D 2500 watt transmitter covers the 2-26 mc. range.

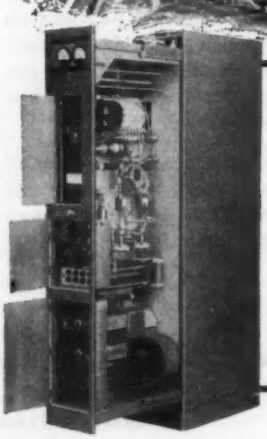
UNIT CONSTRUCTION OFFERS OPERATING FLEXIBILITY

Either simultaneous transmission on several frequencies or the selection of an individual frequency best suited to your particular problem.

JAN COMPONENT STANDARDS FOR DEPENDABILITY

All components meet the latest JAN specifications. This means maximum resistance to wear, corrosion, humidity, fungus, temperature, and time.

Write Today for complete information and specifications on the Wilcox 96D Transmitting Station.



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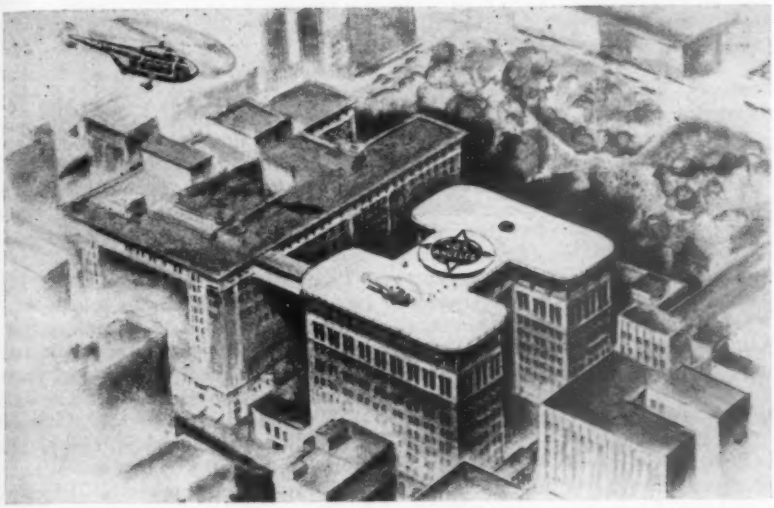
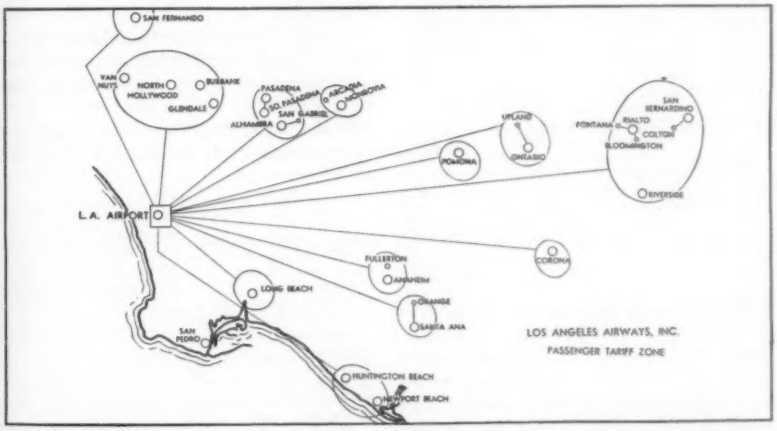
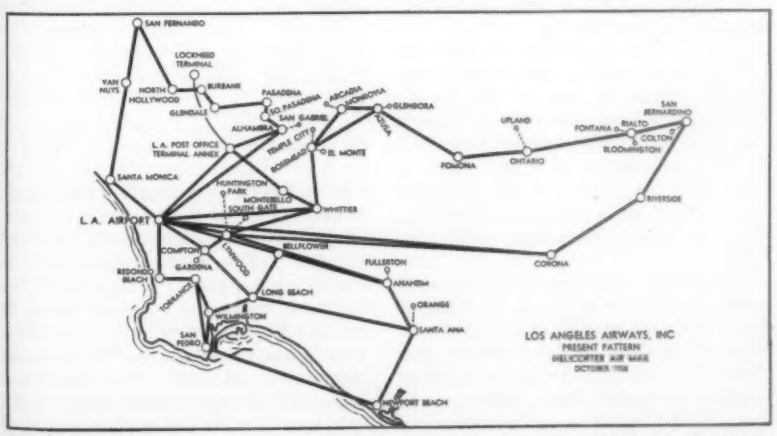
LAA Readies Passenger Copter Service



DOWNTOWN HELIPORT eventually will be focus of LAA passenger service. But first . . .



AREA SERVICE will be started between sections shown and airport. In next phase . . .



MAIL ROUTES now being operated will also be given passenger service to L. A. airport.

First U. S. operation of its kind likely to start next summer.

In one of its most far-reaching decisions to date, Civil Aeronautics Board has authorized Los Angeles Airways, pioneer carrier of mail and cargo by copter, to haul passengers throughout a 50-mi. radius of metropolitan Los Angeles, and beyond to San Bernadino.

The decision paves the way for a new era in American air transport—scheduled copter service in competition with automobile and buses and sometimes trains in crowded metropolitan areas. Other copter operators can be expected to begin the scramble for strategic footholds soon. Chicago's Helicopter Air Service, now carrying only mail and cargo, may be next to start passenger service. New York Airways, awaiting CAB certification "momentarily," is eager to get started, although it will probably have to break in with a mail and cargo service only, as have the others.

▶ **Potent Potential**—The potential seems to exist. According to CAA studies, more than 62 percent of future air traffic anywhere in the country will be generated within the so-called under-200-mi. range. Half of all passengers travel less than 400 miles.

To narrow the field specifically to the possibilities of the LAA operation, consider the number of air passengers per week emanating from just one of Los Angeles Airways' proposed passenger service stations, Pasadena, to the International Air Terminal at Los Angeles. A check showed that in the case of seven carriers alone, 555 passengers came in from Pasadena. At present, these passengers have to undertake approximately 45 minutes of surface travel through congested Los Angeles to the International Airport. LAA can get them there in 10-15 min.

It was also found that 300 reservations were sold in two months as far away as Riverside for departure on aircraft from the airport terminal.

Los Angeles County's Department of Aviation has been quick to realize the potentials. It has revised its master plan of airports for the Los Angeles County metropolitan area and replaced many of the planned airports with heliport locations.

Ever-cautious CAB won't let LAA President Clarence M. Belinn fly pas-

sengers into thickly congested downtown areas—yet. Both the Board and Examiner Ferdinand Moran think it's too early to take chances flying passengers in single-engine copters onto rooftop heliports over crowded streets.

▶ **Equipment Delay**—Ironically, military urgencies, which have done so much to expedite copter development, now provide the biggest drawback in deliveries of the type of equipment which would do so much to speed up passenger copter service growth.

So Belinn will operate out of Los Angeles International Airport initially using three-passenger Sikorsky S-51s, later with eight-passenger S-55s now on order.

When? Belinn, snowed under by a barrage of inquiries brought on by approval of his LAA passenger-carrying application, cautions, "Don't expect too much too fast." Best estimate now is that service will start next summer.

• **Phase One** was to be three round-trips daily from the International Airport to Pasadena, Riverside, Santa Ana, San Bernadino, Pomona and Anaheim.

The first four points are definite. They would have been flown this year in S-51s, but for the recent crash which killed CAA Inspector Wyman Ellis and LAA Pilot John DeBlauw. Now Belinn needs his remaining four S-51s to fly the mail. He doesn't want to buy another S-51 because he expects to get his first S-55 around September of this year.

With this equipment, LAA will be able to begin Phase One next summer and include Pomona and Anaheim in the service.

• **Phase Two,** a year or a year-and-a-half later, will add other cities to the passenger route, with many or all the 45 cities being serviced on the present mail route included. Resort areas, such as Catalina Island and Lake Arrowhead, may be added.

• **Phase Three** will extend the service into downtown Los Angeles.

▶ **Fare Comparison**—Comparative studies between projected copter fares and present taxi fares, all from cities listed to Los Angeles International Airport show the copter's firm competition:

Location	Miles	Copter	Taxi
Pasadena	19	$3.42	$7.00
Pomona	37	6.00	15.00
Riverside	58	6.00	23.00
Santa Ana	33	3.96	12.75
Downtown L. A.	10	2.50	3.80

Fares are based on a rate structure of between 12 and 17.5 cents per mile at a load factor of 50 to 75 percent. Belinn believes that a fare of 18 cents is readily obtainable.

CAB has given LAA an exemption to make up its own routes, so the carrier can vary the experimental route service, at will, without going through expensive, time-consuming formal CAB proceedings before trying a new route and schedule combination. But, the complete schedules freedom applies only to mail and cargo. The Board insists that Los Angeles Airways get specific permission prior to starting a new passenger route.

▶ **Five-Year Plan**—The Board decided that a five-year authorization would suffice to test the carrier's experiment in passenger service and still give the airline time to do proper planning and financing. Examiner Moran had recommended a seven-year authorization.

CAB reasoned, "We recognize that the integration of passenger service into the carrier's present system involves planning for substantial periods ahead. We are also cognizant of the many handicaps faced by the carrier as a result of the present (Korean) emergency, particularly . . . in obtaining equipment for passenger operation. However, a proper regard for the government's obligation to support the experiment through mail pay requires that, at this time, we confine the term of experiment to a five-year period."

Pointing up LAA's needs for some permanence so as to be able to plan ahead, is its tentative time-table on capital requirements:

Date	Type	Totals
1-1-51	Equipment purchases	$17,500
4-1-51	Equipment purchases	27,500
7-1-51	Equipment purchases	25,500
10-1-51	Equipment purchases, including first S-55	167,500
4-1-52	Equipment purchases, including second S-55	174,000
	(Less sale of one S-51	$14,016. 159,984)
10-1-52	Equipment, including third S-55	161,000
4-1-53	Equipment purchases, including fourth S-55	129,000
	(Less sale of one S-51	$6,986. 122,014)
	Total	$673,611

▶ **High Cost of Leasing**—The high cost of starting an experimental passenger copter service is exemplified by procurement of a heliport on a rooftop in the high-rent downtown area. LAA plans to lease a luxury passenger lounge and heliport atop the Pacific Mutual Life Insurance building now under construction in Los Angeles.

That a heliport adds definite value to a commercial building has already been brought out in the case of the Pacific Mutual Life structure. One tenant, who had definitely intended to cancel his lease on one of its upper floors to move to a less congested area, changed his mind when he learned of the firm plans to install the heliport atop the roof.

The carrier's financing plans are adequate for the time being, at least to carry through on the initial stages of Phase One. But, as LAA swings into Phase Two, it will probably want to broaden its capital base, which can be done by selling more of its authorized stock. Only 30,000 shares at $10 par have been sold out of 50,000 authorized. Assets as of June 30, 1950, were $254,702.

For Phase Three (full-scale operations), LAA will need more than $1 million in equipment, plus $1 million in subsidiary items, including heliports, rights-of-way, and so forth. The $1-million Pacific Mutual Life Insurance heliport is not included in this estimate, since it will be paid for by Pacific Mutual and leased to LAA on a long-term basis.

In a typical year of operation during Phase Two, after LAA starts passenger service with the eight-passenger S-55 and is using four S-55s and two S-51s, Belinn calculates that operating costs will be $908,033 for 4,639,144 seat miles at cost of $1.25 per mile.

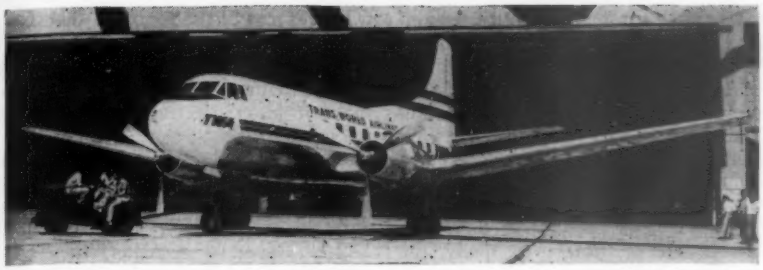
▶ **Proposed S-65**—Belinn still has his eye on a copter which he has proposed to Sikorsky, the S-65. It would incorporate many S-55 features, but have two engines, be bigger, simpler and more rugged. The proposed S-65 would seat 16-24 passengers, have a gross weight of 16,000 lb., and sea level airspeed of 125 mph. Powerplants would be two Wright R-1300s of 800 hp. each. Fuselage length would be 55 ft., width 6.5 ft., height 18.5 ft., and rotor blade diameter 73 ft.

The S-65's engines would be mounted on a 90-deg. vertical axis, one each in a combination power, fuel and landing gear nacelle.

▶ **Projected Costs**—Here is a projection of operating costs for the S-55 and the S-65:

	S-55	S-65
Cost	$125,000	$200,000
Seats	8	16
Cost per seat	$15,625	$12,500
Gross weight	7,000 lb.	16,000 lb.
Cruising speed	90 mph.	125 mph.
Average speed per revenue mi.	75 mph.	115 mph.
Days utilization	365	365
Revenue hours yearly	2,057	2,400
Revenue miles yearly	152,757	276,000
Revenue miles daily	419	756
Available seat miles yearly	1,222,024	4,416,000
Available seat miles daily	3,348	12,099
Flight operation, insurance	$0.10	$0.07
Other expenses	0.32	0.74
Direct maintenance	0.20	0.37
Depreciation, flight equipment	0.17	0.11
Per seat mile operating cost	0.09	0.08
Per mile direct cost	0.79	1.29

▶ **Early Efforts**—Earlier efforts by others to make a go of copter passenger service did not materialize. CAB once certificated Yellow Cab in Cleveland to handle such a service, but revoked the certificate when the company failed to use it. Elmer Gustaffson's nonscheduled Boston operation in 1947, between Logan Airport and the downtown Motormart, using a Sikorsky S-51, lasted only four mouths before it went out of business.



TWA's First 4-0-4 Rolls Out

Trans World Airlines moved one step nearer completion of its new equipment program when Glenn L. Martin Co. rolled out the first Model 4-0-4 which is expected to make its first flight soon.

This is the first of 41 scheduled for delivery to TWA starting about September. Of the total orders for 103 Martin 4-0-4s to date, TWA gets 41, Eastern Air Lines 60 and U. S. Coast Guard 2. One of TWA's 4-0-4s will be resold to Howard Hughes for special experiments.

Trans World also has 10 Super Constellation 1049s on order.

The Martin 4-0-4 is an almost completely different plane than th. 2-0-2. That's clearly evident from the fact that about 80 percent of the production tooling for the 4-0-4 is new (AVIATION WEEK June 25, p. 14).

Trans World has ordered its 4-0-4s with white paint on the sides as well as top of the fuselage—to reflect sun and aid in cooling the cabin. White paint also makes cleaning cheaper and quicker. Most airlines that have gone over to white paint to keep the cabin cooler paint the top only.

Here is TWA's present equipment situation:

On hand	
Constellation 749	36
Constellation 049	29
Douglas DC-4	14
Martin 2-0-2A	12
Douglas DC-3	51
Total	142
On order:	
Super Constellation 1049	10
Martin 4-0-4	40*
Total	50

*For line use. One more being bought through TWA for Howard Hughes.

Decision Opens Way To Suits by Nonskeds

A number of court suits by nonsked airlines against the scheduled lines may follow the District of Columbia U. S. Court of Appeals decision that an irregular nonsked airline can sue a scheduled airline for alleged violation of the anti-trust laws.

In February, 1949, the Air Transport Assn. and the regular airlines placed full-page ads in news media—ads the irregulars contend disparaged passenger travel conditions and safety on nonsked airlines. Nonsked S. S. W., Inc., filed suit.

The lower court said it had no jurisdiction over the case. It said the Civil Aeronautics Board should hear such complaints.

▶**Court Comment**—But here's what the Court of Appeals says:

"In the light of congressional failure to provide a remedy for damages in the Civil Aeronautics Act, we conclude that Congress did not intend to deprive an air carrier of its right to seek treble damages for violations of the anti-trust laws.

"We do not intend to intimate that appellant may recover damages for appellees' violation of the Civil Aeronautics Act. Treble damages may be obtained only for injuries to business and property resulting from action forbidden by the anti-trust laws. And the District Court, rather than the Board, is the forum in which the latter issue must be resolved.

"What we are saying is that the same set of facts may give rise to both a violation of the Civil Aeronautics Act and a violation of the anti-trust laws. Although the second does not necessarily follow from the first but is bottomed upon its own statutory standards, the anti-trust remedy of treble damages is not defeated by the fact that the Civil Aeronautics Act is also violated."

The lower court decision was reversed and remanded.

The nonsked airline, S. S. W., Inc., alleges the scheduled airlines have combined and conspired to restrain and to monopolize the air-borne commerce of the U. S. "by suppressing competition therein and by controlling the channels through which prices, terms and conditions thereof are determined. . . :" The suing nonsked airline asked for injunctive relief and for treble damages.

▶**What Ad Said**—Here are excerpts

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You may think this an unusual attitude for an employer to take, but the fact is, "self-interest" is often overlooked and even considered undesirable by some employers.

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from one of the scheduled-airline-sponsored advertisements complained of by the nonsked:

"Actually, their (the nonskeds') purpose is to enlist the aid of the government departments to continue their present operating procedure which, in many instances, is in violation of the law. . . .

The ads asks prospective buyers of nonsked airline tickets to query the nonsked as follows:

"Are you required to operate under the same safety standards as the regular certificated airlines?"

"In the event of an accident, do you carry sufficient insurance to protect the families of your passengers?"

"What is the comparable safety record of your group and that of the regular certificated airlines?"

The scheduled airlines finish by saying "unless these questions can be answered to your satisfaction, it is to your interest to refuse to support these operators."

▶ **Complaint**—First of eight charges by S.S.W., Inc., accuses the scheduled airlines and the Air Transport Assn. of conspiring to "solicit, persuade, induce, and coerce ticket agencies and travel bureaus from acting as agents for plaintiff and other irregular air carriers and 'nonskeds' and from making sales and distribution of tickets, charters and contracts on their behalf." Another claims the scheduled lines and ATA "discredit and disparge the plaintiff and other 'nonskeds', or irregular air carriers, and destroy public confidence in them by means of false and misleading advertisements and news releases and stories."

Actually, the nonskeds' safety record (since shortly after the time of the ad cited) has been better than that of the scheduled airlines, statistically, although that does not mean they have been truly safer to ride in.

Now that the Court of Appeals has opened the way, other nonsked airlines plan to sue the scheduled airline industry. Among the prospective suers: Air Transport Associates, Inc., carrier belonging to Amos Heacock, who also is president of the Air Coach Transport Assn.

Hope Wanes for New Local Service Plane

Local service airlines are losing hope of getting a new fixed-wing plane to replace the obsolescent DC-3. The President's supplemental 1952 appropriation request for prototype testing money (AVIATION WEEK July 2, p. 15) mentioned only turboprop and turbojet experimentation—mainly for airways planning.

But CAA may also make other use of whatever part of the $600,000 that Congress appropriates.

One local airline quest is for testing some modifications on the DC-3 to make it faster. Retractable tail wheel is one suggestion.

Only actual DC-3 replacements on hand that the locals have considered are the 11-passenger de Havilland Dove and the 32-passenger Douglas Super DC-3. Generally speaking, they consider the Dove too small, the Super-Three too big.

When Wiggins Airways contemplated ordering two Doves, CAB pulled the rug out from under Wiggins by granting inadequate mail pay, practically forcing Wiggins to merge with Robinson.

▶ **Super-Three Chances**—Douglas Aircraft made a carefully prepared sales pitch on the Super-Three to the locals at their Purdue University seminar last month. The local airline executives applauded the delivery, but most if not all of them ignored its import as impractical; the locals seem to stand set against buying the Super-Three, at least now.

However, the locals still hope some day to put through an entirely new bill. This would be a local service transport prototype construction bill. The present prototype testing bill can't help them much because it provides money only for testing existing planes. Since there's no plane near the local service requirement, there's not much point in having money for testing.

EAL's Big Plan

Carrier launches its $100 million program for new equipment.

Plans for a $100 million re-equipment program, probably the largest single fleet replacement ever undertaken by an airline, were completed last week by Capt. Eddie Rickenbacker, President and General Manager of Eastern Air Lines.

All EAL's DC-3s and DC-4s (total of 72) will be replaced by 60 Martin 4-0-4s seating 40 passengers and 30 Lockheed 1049 Super-Constellations carrying 88 seats. The airline will retain its 20 new-type Constellations. Of the total equipment expenditure, $55 million will go to Lockheed and $40 million to Martin. Another $5 million is earmarked for new equipment servicing facilities.

Rickenbacker stressed that both the 4-0-4 and Super-Connie were designed for "overnight" conversion to jet power as soon as it becomes commercially available.

Immediate result of installing the new

craft will be a more than 100 percent increase in EAL's capacity over its trunk routes and a considerable speed-up of its schedules. The 130,000-lb. Super-Connies will cruise at 350 mph. when Wright R-3350 compound engines are installed, the airline estimates, while the 4-0-4s will fly 100 mph. faster than the 180 mph. DC-3s.

EAL indicated that the first 4-0-4 will be delivered in September of this year and placed in service a month later. All 60 will be delivered by July, 1952. First Super-Constellation is scheduled to go to EAL in October with the final delivery set up for early 1953.

Financing of the program revolves around a $13 million credit negotiated with a group of 27 banks in Eastern's territory. Advance payments of $25 million already have been paid manufacturers.

Included in the new servicing facilities is what EAL describes as "the world's largest commercial overhaul and line maintenance building" on which construction is to start soon at the company's main base at Miami. Additional operating facilities are also scheduled for New York, Chicago and Atlanta.

Start Preliminaries For Capital Airport

Surveyors and land appraisers are well into the preliminary job of land acquisition and layout for the new No. 2 Washington Airport 15 air miles southwest of the White House designed to cure the serious air traffic jam at Washington National Airport.

Congress has authorized $1 million for acquisition of the 4,520-acre site. First phase construction plans call for expenditure of $14 million in all. Construction projected for further expansion calls for additional expenditure of $24 million, making a total cost of $38 million.

▶**Airport Provisions**—Here is what the Phase I airport, all that is contemplated under present fund authorizations, will provide:

Two non-intersecting 7,000-ft. runways, north-south and east-west; a 5½-mile two-lane access road from nearby Shirley Highway (a four-lane express highway into Washington from Virginia); a control tower, a temporary terminal building, 75-ft. wide taxiways, interior roads and parking areas.

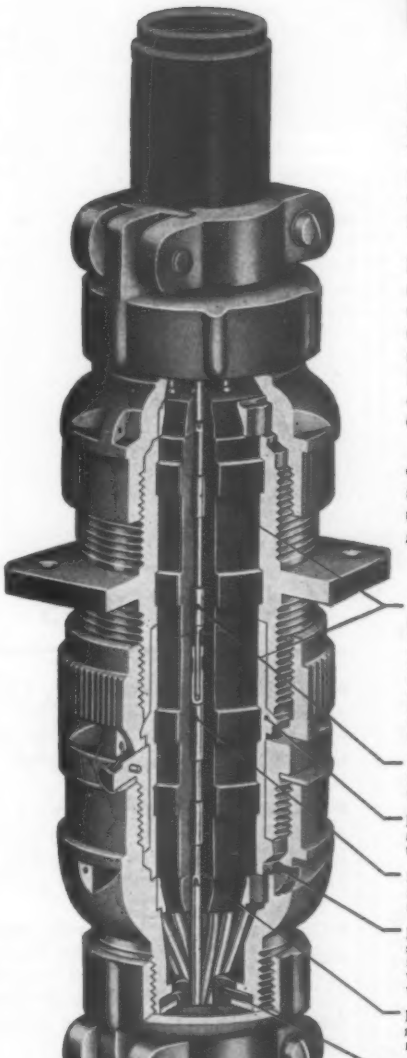
Hangars are revenue-producing and will be built on a self-amortizing plan as needed, so expenditures for them are not included in the overall cost.

▶**Later Plans**—Subsequent expansion of the new airport facilities is tentatively planned in these three steps:

1. A second 7,000-ft. north-south runway, staggered with the first and paralleling it, plus access roads, a per-

Here's why those in the know —demand

CANNON PLUGS



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manent terminal building, and extension of interior roads, parking areas and storage facilities will cost $12 million.

2. Both north-south runways would be extended to 10,000 ft. and access road widened to four lanes. This plus additional minor improvements are set at $5 million cost.

3. East-west runway would be widened from 150 to 200 ft. and all taxiways would be widened to 100 ft. Additions to terminal and maintenance buildings and additional paving and utilities improvement would be provided with a total cost estimated at $7 million.

Land cost, it is estimated, will be around $200 an acre to the 75 families residing on the hilly suburban site. Major job of leveling the land will be an earth removing and filling one. A screen of trees is expected to be maintained around the boundaries of the field in an effort to make the airport a "good neighbor," CAA officials said.

First phase of the airport plan is designed to take care of forecast 1955-1960 air traffic in the Washington area.

It is probable that the bulk of long-haul air traffic will be transferred to the new airport, due for completion (Phase I) in the spring of 1955. Washington National Airport will continue to handle short-haul traffic.

SHORTLINES

► **Air India International**—Flew 12,267 passengers last year, plus 313,000 lb. mail and 674,000 lb. cargo. Line celebrated its third birthday last month.

► **All-American Airways**—Claims a record day's haul for any local service airline—1,057 passengers carried July 8. Day's load factor averaged 65 percent.

► **Canadian Pacific Airlines**—Is negotiating sale of its three Canadair IVs now operating to the Orient and Australia. New CPA fleet will be two de Havilland jet Comets and three Douglas DC-6Bs.

► **Continental Air Lines**—Came in for a windfall during the ten-day United Air Lines strike, flying 50 extra sections between June 19 and June 28, carrying 1,015 persons. Eleven extra flights were by Convair-Liner 240 and 39 were Douglas DC-3.

► **Northeast Airlines**—CAB has approved Northeast-Eastern contract for Eastern to lease DC-3s and crews this summer to help haul Worcester-New York traffic. One proviso: they can't advertise flights as through service; plane

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▶**Pan American World Airways**—First year of Stratocruiser service New York-Buenos Aires totted up 288 flights carrying 23,192 revenue passengers 1,719,965 passenger miles without an accident. Contrary to previous reports from one of the carrier's offices, nonstop services between New York and Caracas (AVIATION WEEK July 16, p. 77) which are included in current schedules filed with CAB cannot become effective unless approved by the Venezuelan government. Discussions between the two countries are now underway.

▶**Slick Airways**—More than doubled ton miles the first half of this year over last. Ton miles first half 1950 were 35 million, compared with 15 million a year ago. June ton miles: 5.5 million compared with 3 million a year ago.

▶**Southern Airways**—Local service airline flew almost three times as many passengers this June as last. June, 1951 passengers on numbered 8,809, compared with 3,214 a year ago. Southern serves 31 cities in the south—12 exclusively.

▶**Trans World Airlines**—Starts service to Broome County Airport serving Binghamton, Johnson City and Endicott, N. Y., Sept. 30. TWA serves 60 other cities in the U. S. and 20 more abroad. . . . Has appointed Frank C. Hobbs manager of financial forecasts; A. E. Jordan manager of overhaul at TWA's maintenance and overhaul base at Kansas City.

▶**United Air Lines**—Flew 817,959,000 revenue passenger miles the first half of this year, up 26 percent over 1950. Express ton miles are up 41 percent to 5,334,000; mail up 40 percent to 8,080,000; and freight down 5 percent to 11,964,000 ton miles. June traffic was cut sharply by ten-day pilot strike; 123,144,000 passenger miles this June are 20 percent over a year ago. June mail was down three percent and cargo 43 percent for the same reason. And compared to May of this year June passenger miles dropped 27 percent, mail ton miles 40 percent and cargo 43 percent.

▶**Western Air Lines**—First half-year was a record financial success. Estimated net profit is over $600,000 or $1.15 a share. Second quarter alone netted $433,000 or 83 cents. First half of last year netted only $188,110; 1950 second quarter net profit was $225,817. First-half operating revenue this year of $8,100,000 is 22 percent over last year. Operating expenses were up only 11 percent to $6,800,000.

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AVIATION CALENDAR

July 23-24—Fifth annual meeting, University Aviation Assn., University of Florida, Gainesville, Fla.

July 24-28—Armed Forces Procurement Clinic, Cleveland.

July 28-29—Dedication of new Oneida County airport, Oneida, N. Y.

Aug. 6—International air race for the Daily Express Cup, England.

Aug. 11-19—Eighth annual Michigan aviation week, sponsored by the Aero Club of Michigan.

Aug. 15-19—Fifth annual all-woman transcontinental air race, sanctioned by the Ninety-Nines, Santa Ana, Calif., to Detroit, Mich.

Aug. 18-19—National Air Race, Detroit, Detroit-Wayne Major Airport.

Aug. 22-24—Western convention of Institute of Radio Engineers and Seventh Annual Pacific electronic exhibit.

Aug. 22-26—International convention of the Ninety-Nines, Mackinac Island, Michigan.

Aug. 24-26—Fifth annual convention of the Air Force Assn., Ambassador Hotel, Los Angeles, Calif.

Sept. 3-7—Royal Aeronautical Society-IAS third international aeronautical conference, Brighton, Sussex, England.

Sept. 10-14—Sixth national instrument conference and exhibit sponsored by the Instrument Society of America, Sam Houston Coliseum, Houston, Tex.

Sept. 10-16—Seventh annual general meeting of the International Air Transport Assn., Westminster School, London, England. Program includes one-day visit to SBAC Farnborough show.

Sept. 11-16—Twelfth flying display and exhibition of the Society of British Assn. of Constructors, Farnborough, England.

Oct. 2-4—Seventh annual aircraft spark plug and ignition conference sponsored by the Champion Spark Plug Co., at Toledo, Ohio.

Oct. 8-10—Special conference on aircraft electrical applications, sponsored by the Air transportation committee of the American Institute of Electrical Engineers and the Los Angeles section of the Institute, Hollywood Roosevelt Hotel, Hollywood, Calif.

Oct. 11-12—1951 conference on airport management and operation, University of Oklahoma, Norman, Okla.

Oct. 16-17—Fourth annual New York State conference on airport development and operations, sponsored by the N. Y. State Dept. of Commerce, N. Y. Aviation Trades Assn., Assn. of Towns of the State, Conference of Mayors, County Officers' Assn. and the N. Y. State Flying Farmers, Onondaga Hotel, Syracuse, N. Y.

Oct. 29-30—Air Industries & Transport Assn. of Canada annual general meeting, Seigniory Club, Montebello, Quebec.

PICTURE CREDITS

9—(SO-30C) Howard Levy; (all others) McGraw-Hill World News; 14—Howard Levy; 19—(top two) Glenn L. Martin Co.; (bottom) English Electric Co.; 22-23—Glenn L. Martin Co.; 23—(bottom photo) English Electric Co.; 57—Glenn L. Martin Co.

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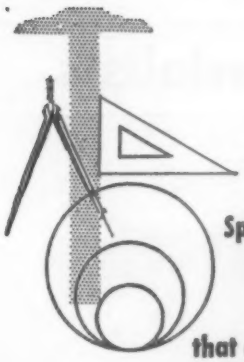

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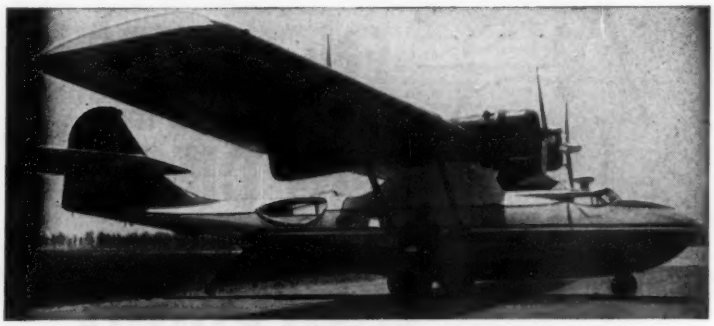

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2967	35817	Spring
280	35855	Cap
2446	35984	Washers
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192	46400E	Liner
30	48346	Cylinder
1475	48360	Bearing
53	48362	Shaft
175	48363	Shaft
100	48389	Fitting
209	48390	Retainer
56	48392	Sump
333	48447	Bushing
107	48457	Adapter
390	48461	Gear
149	48468	Bearing
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389	48469	Bearing
470	48470	Bearing
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93	983748 Oxygen cylinder (full) w/valve #X4015 Charges to 1800 PSI
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All-Weather Flight and Outdated Thinking

(This is the first of three parts in a series on All-Weather Flying)

All-Weather flying should be commonplace by now. This long sought goal of aviation can be attained with available facilities if some changes are made in outdated thinking.

At present, bad weather landings are controlled by CAA's system of "minimums." This policy establishes minimum ceilings and visibilities for each airport. Determination of these factors is the job of the United States Weather Bureau. When observations indicate that the weather is below the CAA standards no plane may descend below its last assigned altitude.

Obviously, the entire theory of weather minima hinges on the accuracy of the USWB observations. How accurate are they?

►**Reports vs. Accuracy**—Best information on this question is found in the reports on a series of "Actual Weather Low Ceiling Flights" by Sperry Gyroscope Co. By plotting USWB reports against actual observations made from a cockpit at the same instant a mathematical analysis of the accuracy of ground observations was made. Some Sperry quotes:

". . . for a reported ceiling of 250 feet it is almost a certainty (i.e. the probability is .95) that the vertical contact height observed during any given approach will occur within the limits of 50 feet and 450 feet." (This for day approaches.)

". . . for a reported ceiling of 150 feet the actual vertical contact height observed during any given approach will occur between the limits of 190 and 360 feet. In the particular case of a USWB ceiling reported as zero the vertical contact height actually observed during any given approach can be expected to occur within the limits of 100 and 300 feet." (At night.)

". . . night ceiling observations do not measure vertical contact height as seen by the crew."

►**Minimums No Help**—"It is clear that the reported weather does not enable flight crews to predict, within reasonable limits, the altitude at which either vertical or threshold contact will be obtained. The pilot cannot predict within reasonable limits where transition will begin. This is particularly true during day operations. This limitation of current weather observation methods has been independently observed by the Landing Aids Experiment Station at Arcata, California and by Mr. E. S. Calvert and his associates at Farnborough, England.

"In view of this limitation the crew must make its own observations during each approach and assess the weather and transition. Vertical contact height marks the initial assessment and is the beginning of transition to visual flight."

It is obvious from these measurements that the CAA weather minimum policy has no excuse for existence.

►**New Theory**—A more sensible approach is one that has been taken by the Flight Technical Group of the International Air Transport Assn. (IATA), composed of top-notch pilots and operations men of leading airlines. Their theory is currently being studied by ICAO.

This new thinking eliminates weather criteria and establishes a "critical altitude" based mainly on aircraft performance and terrain. The program calls for the establishment of an altitude for each type of aircraft at each airport below which the plane cannot safely execute a "go-around."

Regardless of the "official" (ground observed) weather a plane may let down to this critical altitude where the pilot must determine if a safe, visual landing can be made. If the answer is negative a pull-out is begun.

The critical altitude concept, based on what the aircraft can do safely, under various conditions of terrain and equipment, appears more sensible.

WHAT'S NEW

New Books

High Horizons, by Frank J. Taylor, is the story of United Air Lines, during the course of which the author tells a good deal of the story of the early days of U. S. air transportation.

It is a tale that has been well-told before, but it still retains its fascination in Mr. Taylor's version. In addition, this book has an unexpected interest at this time. Mr. Taylor goes into some detail on United's employe relations and employe policy—which became top news almost concurrently with publication when UAL pilots went out on strike.

Two incidents in particular related by Mr. Taylor furnish a sidelight to United's current negotiations. In 1948, UAL's President W. A. Patterson and the Air Line Pilots Assn. President David L. Behncke clashed over a new contract. A deadlock ensued and a pilot representative privately asked Patterson to yield "and save Behncke's face," in return for which the UAL pilots "would see to it that the union did not take advantage of the concession."

"'Well, how about my face?' demanded Patterson.

"Mrs. Patterson, who had been listening, spoke up, 'Why not get out of this business and enjoy some peace of mind?'"

Patterson actually decided to do that, the author says, until the alarmed pilots talked him out of it.

Many years before, at the time of the air mail cancellations, most of the major airlines shut down rather than pile up losses when they had no mail pay coming in. United continued to operate, even though it cost the line more than $1 million. According to Mr. Taylor, the decision was Patterson's who said, "Our pilots and our ground crews have to eat . . . This is our opportunity to show our people they are in a stable business."

Publisher is McGraw-Hill Book Co., 330 W. 42 St., New York 18. Price is $4.00. WK

Telling the Market

Armetol, an impregnant for magnesium alloy, aluminum bronze and other non ferrous castings is described in Technical Bulletin 501, which also notes nine advantages of the ready-mixed impregnant over tung oil and sodium silicate methods. Write Archer-Daniels-Midland Co., Foundry Products division, 2191 W. 110 St., Cleveland 2, Ohio.

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EDITORIAL

Rails & Fares

Raising fares and cutting passenger service continues to be the order of business by Eastern railroads. The Pennsylvania was to eliminate 40 passenger trains on July 8, including The General, famous New York-Chicago all-Pullman train. (Pullman raised fares 15 percent June 1.)

New York Central is studying elimination of unprofitable trains. It recently merged the Pacemaker and Advance Commodore Vanderbilt between New York and Chicago. (American just started hourly commuter flights on this run.)

Major railroads in the South asked ICC for a 10-percent increase in passenger fares. They would raise coach rates from 2.5 cents a mile to 2.75 cents, and Pullman fares from 3.5 cents to 3.85 cents. And ICC told Eastern railroads to go ahead and file for a 15-percent roundtrip discount in coaches instead of 24 percent, as at present, and 5 percent on Pullmans instead of 10 percent.

Meanwhile, the Long Island admitted (no figures) that a "considerable number" of commuters have stopped using the railroad since it raised commutation fares 20 percent last April.

We hope the scheduled airlines, already profitably above their break-even points, read all this if they are tempted to raise air fares.

The Collision Threat

Two mid-air collisions splattered across the newspaper front pages a few days after AVIATION WEEK warned editorially on Apr. 23 of an increasing likelihood of such accidents. There have been two others more recently, involving military aircraft.

Obviously, the timing of the April editorial was sheer coincidence. But, unless there is some kind of concerted and coordinated action by all aviation interests—commercial, private and military—an increase in collisions will not be sheer coincidence.

AVIATION WEEK's comments on this subject are not pleasant. Nor do we enjoy being a prophet of calamity. But the subject needs the most serious attention.

There are not enough rules of practice to cover the most important potential causes of collisions. Too many of the presently existing rules are being ignored and violated. There are too many loopholes in current regulations. There is difference in interpretation of various rules and practices.

The collision problem in all its ramifications would be a valuable study for someone to finance, provided the report carried with it sound recommendations to diminish this threat.

Must we await the inevitable accidents before we act? The worst are those that could have been prevented.

Organize or Hang?

The scrappy Air Coach Transport Assn., like its determined members, has fought a stout fight for the nonscheduled passenger carriers. The odds against it would have been called overwhelming several months ago.

The government's Civil Aeronautics Board was well embarked on a liquidation program for the nonskeds, and made no bones about it. The scheduled air mail carriers were wielding hefty blows on Capitol Hill—which had been displaying only a mild, polite interest in the nonskeds' low fare cause.

Yet ACTA President Amos Heacock kept pounding away, substituting vigor for adequate funds—some of them his own. Heacock has never been a diplomat but even those few members of Congress he miffed admitted he had a cause.

The association has won a court injunction to stave off CAB's "death sentence," and it has won a warmly sympathetic report from the House Small Business Committee, at a time when this Administration is foresworn to befriend the small business man. ACTA has also been winning increasing attention from the press. The New York Times considered the Committee's report front page news.

These are important achievements. But the association's backlog of work yet to be done is big if the nonskeds are to win legal reprieve to stay on the scene and become a permanent segment of air transportation.

This is no time for the various carriers to disband and go again their haphazard ways, forgetting once more about cooperation and the self-policing that has cut but still not eliminated the public's complaints about nonsked service.

The nonskeds have a future, we think, but only if they fight for it. Let them take as an object lesson the unfortunate abandonment by the local service carriers of their own Feeder Airline Assn. some years ago before those then brand-new lines had solved some of their most important problems. We believe the lack of a strong association devoted exclusively to the local airlines' own interests has been a serious handicap ever since FAA was permitted to fall apart.

There is some sentiment among the so-called independent lines for a strong association comprising the better non-mail carrying lines. This group would comprise two subdivisions—the passenger and the cargo lines, including the presently certificated air freight companies who also operate without government payments.

The idea is sound. The advantages to the carriers of this combined strength are self-evident. It's a project that should be studied seriously. What was that Benjamin Franklin said about hanging together or hanging separately?

—Robert H. Wood

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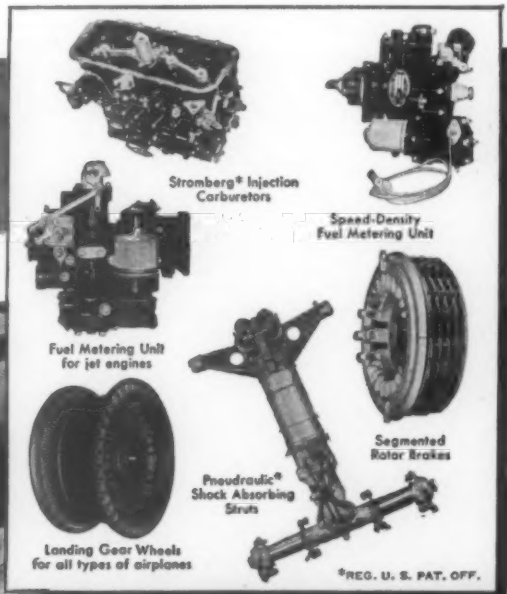
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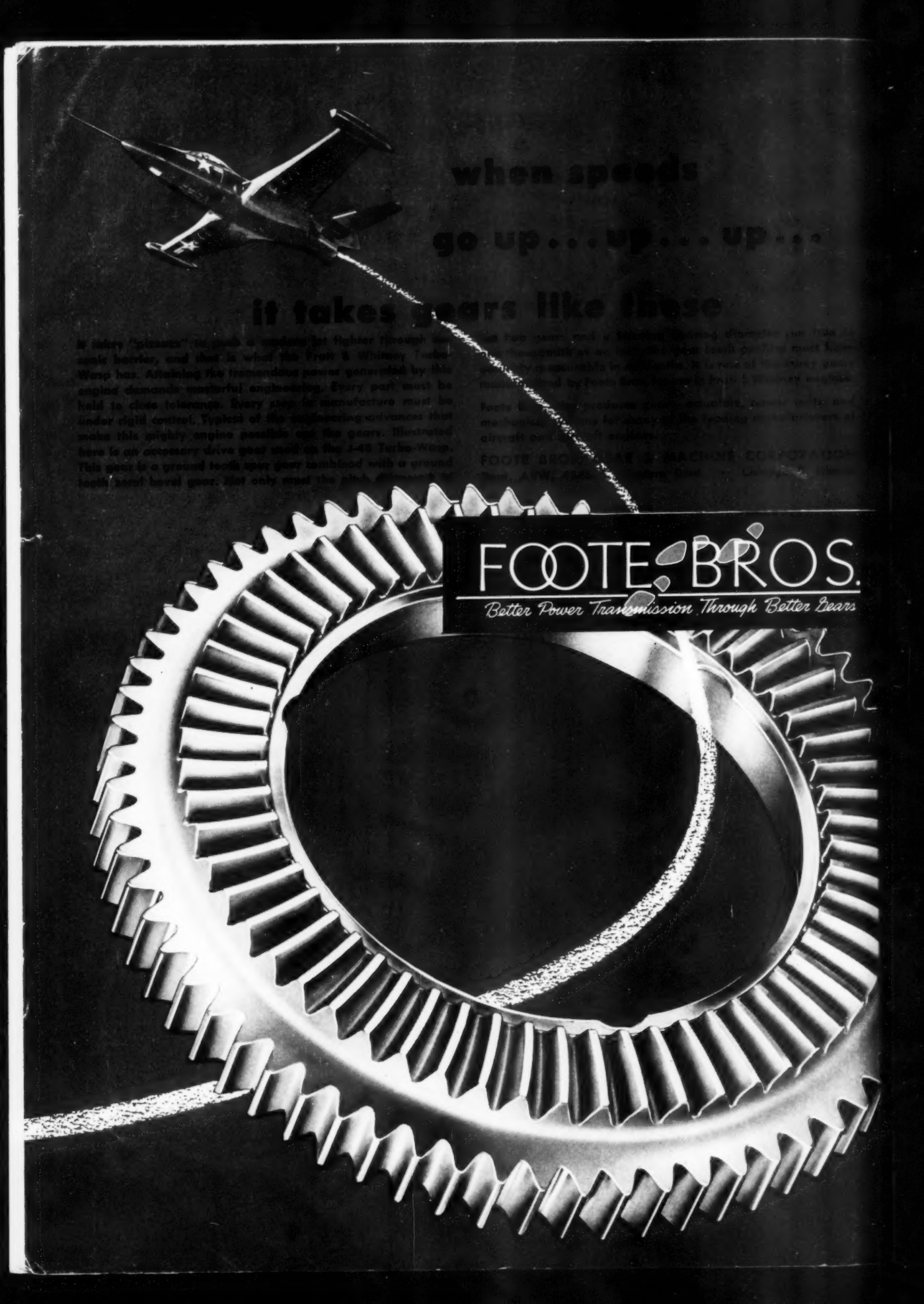
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